Documents accompanying the Report of the Secretary of War.

1. Reports from the Department of Texas.
2. Reports from the Department of New Mexico.
3. Reports from the Department of the West.
4. Instructions respecting Military Roads.
5. Report on the Capitol Extension.
6. Report of the Commanding General, with statements from the Adjutant General.
7. Report of the Quartermaster General.
8. Report of the Commissary General.
9. Report of the Paymaster General.
10. Report of the Surgeon General.
11. Report of the Chief Engineer.
12. Report of the Colonel of Topographical Engineers.
13. Report of the Chief of Ordnance.

REPORTS FROM THE DEPARTMENT OF TEXAS.

HEADQUARTERS DEPARTMENT OF TEXAS,
Corpus Christi, May 10, 1854.

COLONEL: I have the honor to transmit, herewith, a report from Assistant Surgeon E. W. Johns, of an attack on a train twelve miles beyond Fort Ewell, and of the pursuit he caused to be made of the aggressors. I beg leave to call the notice of the general to the prompt, efficient, and skilful measures taken by Assistant Surgeon Johns on this occasion.

It must be observed that as there was reason to expect some expedition on the part of the Indians, several small parties having been seen last moon, all the men that could be spared from the posts were out on scouts, and at Fort Ewell every officer was in the field except Lieutenant Howland, who was sick in bed, leaving the command of the post for some time in the hands of Dr. Johns, assistant surgeon there. Assistant Surgeon Head had just arrived and relieved Dr. Johns; but being a stranger to the country, had left the arrangement of the pursuit to the latter. The non-commissioned officers in charge of the parties sent out, and the men, I know to be as good as any in the army; and of their ability and disposition to render a good account of the enemy, if they can overtake him, I have no doubt; but it is hardly fifty miles to the Rio Grande, and the country is mostly thick chaparral, and hard and dry, retaining little impression of a trail.

I think the party was Lipans and Seminoles, and had just crossed from Mexico. Among the detachments out was one of two non-commisioned officers and eighteen men, from Fort Merrill, under Lieutenant G. Cosby. On Monday he was at Lake Trinidad, about forty miles from this towards Laredo, with half of his command, where he attacked and routed a party of more than forty Indians, killing three and wounding several, and taking all their plunder.

I am sorry to record the loss of Sergeant Byrne, a gallant and good soldier, who fell fighting, pierced with many arrows. Several of the men were wounded, and two are missing. I am afraid they were killed in the chaparral.

Lieutenant Cosby was severely, but not dangerously, wounded in the sword-arm, and his clothes are pierced by arrows. He met Lieutenant Roger Jones shortly after the Indians retreated, who continued the pursuit with sixteen men.

I have no terms to speak my sense of the gallantry and coolness displayed by Lieutenant Cosby in this affair. I beg to call it particularly to the notice of the General, and to beg that some way may be devised for affording to the men the reward they merit for their good conduct, which in this case was conspicuous, having been deserted in the outset by sixteen well mounted and armed rancheros.

Lieutenant Cosby was brought in this moning in a wagon, to receive

surgical assistance, there not being a medical officer in the department to accompany any detachment to the field.

Ascertaining, by the occurrences recited, that the Indians are in some force below the line of posts, I have already despatched the order, a copy of which is enclosed, and will leave no steps untaken to destroy the aggressors.

There are 300 recruits wanted to fill up the rifle regiment, and they could now occupy the posts, and leave all the old soldiers for the field.

* * * * * *

With the highest respect, your obedient servant,

PERSIFOR F. SMITH,
Bvt. Maj. Gen. Com'g Dept.

Lieut. Col. LORENZO THOMAS,
Assistant Adjutant General, Headquarters of the Army.

P. S.—Lieutenant Cosby says the guides pronounce the Indians he attacked to be Lipans, and their chief they recognise as a man of consequence, named Castillo.

P. F. S.

HEADQUARTERS DEPARTMENT OF TEXAS,
Corpus Christi, May 15, 1854.

COLONEL: In my report of the 10th instant, transmitting Assistant Surgeon E. W. Johns's account of an attack on a train near Fort Ewell, I said: "The non-commissioned officers in charge of the parties sent out, and the men, I know to be as good as any in the army; and of their ability and disposition to render a good account of the enemy, if they can overtake him, I have no doubt."

I have now the honor to transmit a report from Assistant Surgeon J. Frazier Head, commanding officer at Fort Ewell, announcing the return of the parties, and I hope the General will see in the result of their pursuit a full justification of the confidence I placed in the parties.

It must be observed that the three detachments, each under the first sergeant of its company, joined together, and, without a guide, pressed the pursuit across a country of the most unfavorable kind for eighty miles without a drop of water for either man or horse, and then continued it twenty-five miles further, until they overtook the Indians. These escaped with their persons, as they can always do near a thick chaparral, but lost their plunder, baggage, animals, trophies, and some of their own arms.

I beg to lay before the General, in terms of the highest commendation, the names of First Sergeant C. H. McNally, company D, regiment mounted rifles, who commanded the detachments united; First Sergeant John Green, company B, same regiment; and First Sergeant John Williams, company G, same regiment. I also enclose the post order issued by Dr. Head, and express my concurrence in his praise of the whole command.

I have understood from Colonel Neighbors, Indian agent, and from a report brought to Ringgold barracks, that three or four hundred Indians are assembled at the place occupied by the Seminoles, under

"Wild Cat," in Coahuila, Mexico, who are preparing for an inroad into Texas. It will take many more mounted men than we have to cover the frontier even up to the mouth of the Pecos. But I shall so dispose of the whole command that I hope to be able to keep them from the settlements; but I must leave the road to El Paso somewhat exposed, for there is not cavalry enough to cover it. I wish most earnestly that an additional regiment of mounted riflemen had been authorized by Congress in time for this necessity, and with the increased pay they could be easily raised.

With high respect, your obedient servant,

PERSIFOR F. SMITH,
Brevet Major General Commanding Department.

Lieut. Col. L. THOMAS,
Assistant Adjutant General, Headquarters of the Army.

HEADQUARTERS DEPARTMENT OF TEXAS,
Corpus Christi, July 15, 1854.

COLONEL: Preparatory to moving the regiment of mounted riflemen from the Nueces to the Rio Grande, in conformity with the instructions of the War Department, the companies were ordered to be got ready, and Brevet Lieutenant Colonel Roberts, commanding Fort Ewell, called in all the detachments from that post; thus uncovering the Rio Grande from Laredo down. Lieutenant Colonel Seawell, at Ringgold barracks, and Colonel Loomis, at Fort McIntosh, immediately reported that small parties of Indians were crossing the river at various places, and committing robberies and murders. I immediately ordered some companies to the river again, and directed the detachment from Fort Merrill, that had been withdrawn from Santa Gertrude's (forty miles from this) on account of the men having the scurvy, to be replaced there; but at 3 o'clock a. m., on the 14th, an express from up the road informed me that Indians had killed some persons at "Proscenius," twenty-five miles north of Santa Gertrudes. I then ordered another detachment from Fort Merrill towards the former place.

In the mean time, on the 4th of July, Captain Van Buren, of the rifles, with eleven men and two non-commissioned officers, was sent by the commander of Fort Inge to scout in the direction of the Rio Grande. Near Lake Espantosa he met a party of 8th infantry from Fort Clarke mounted on mules; they had followed the trail of Indians who had come from the northward, and their animals were broken down. Captain Van Buren took up the trail, and followed it to the southward with unsurpassed diligence and under great difficulties until, on the 11th, in the evening, he met them about thirteen miles from "Proscenius," towards the southwest; they were thirty, and he had thirteen men in all. He attacked them boldly, and the Indians at first stood their ground. Their chief, however, was killed, and his body remained in Captain Van Buren's possession; four other Indians fell, but were picked up by their companions. Captain Van Buren was badly wounded in the arm, but dismounted his men to use their rifles more effectually. He soon routed the Indians, who fled, leaving some horses,

many lances and shields, and other trophies; but I regret to say that Captain Van Buren himself was shot through the body with an arrow, entering just above the sword-belt, and coming out *through* it behind. His wound is very dangerous. He had two men wounded, and his horse was shot in the head. In this situation he could not pursue, but sent a corporal and two men to Fort Ewell for a surgeon and ambulance. As these did not arrive, next day he despatched two other men to meet and bring them in; but these got lost, and, finding a trail, followed it until they reached Palo Alto, twenty-five miles from here. From this place they came here, and I immediately despatched Second Lieutenant Roger Jones, with nine riflemen that were waiting as escort for my departure for El Paso. Dr. McParlin, who was here also to accompany me, went with them with an ambulance.

The party, however, that went to Fort Ewell returned with twenty men, under Lieutenant Colonel Roberts, and were bringing Captain Van Buren here when they met Lieutenant Jones at Palo Alto. Col. Roberts was attacked with the dysentery on the march, and returned to Fort Ewell with his command.

The guide of Captain Van Buren, who is a Lipan Indian, says these Indians are Comanches, and the one killed a chief of consequence.

It is reported that another party of Indians is down, twenty-five in number.

Captain Van Buren has just come in, but the surgeon desires that he may be kept quiet.

I respectfully recommend his conduct in a pursuit of over two hundred miles, and in the action, to the consideration of the government. As the mail goes immediately, I will defer sending his report till next mail.

With the highest respect, your obedient servant,

PERSIFOR F. SMITH,
Brevet Major General.

Lieut. Col. L. THOMAS,
Assistant Adjutant General, Headquarters of the Army.

The surgeon says of Captain Van Buren's wound that it is very dangerous, and it will be extraordinary if he recovers.

P. F. S.

[Extract.]

HEADQUARTERS DEPARTMENT OF TEXAS,
"Painted Camp," on the Limpia, Oct. 9, 1854.

COLONEL: I have the honor to transmit a report from Captain J. G. Walker, of the rifles, of a pursuit of a party of Indians, and an action with them and their tribe on the 3d inst. Captain Walker was in command of my escort. We left El Paso on the 28th of September, and at 2 p. m. on the 1st instant arrived at Eagle spring, having marched, in the four days, 121 miles, and on the last day 35. We met, about 14 miles from the Rio Grande, a party driving cattle, who reported that on the morning of the preceding day, at Eagle spring,

they had been robbed by a party of Indians of from sixty to one hundred head of cattle, which had been driven off to the southwest towards the Rio Grande. After our arrival at the spot, finding the trail led out that way, I detached Captain Walker with a part of the escort, supposing that the cattle might be overtaken before they could cross the Rio Grande, which, from what the owners said, I supposed was their destination; having previously intended, if the trail led towards the north, to have taken the whole of the escort and party in pursuit, as the Indian villages were said to be in that direction. Captain Walker was accompanied by Policarp Rodriguez, the guide, and by Mr. Francis Armstrong, (my step son,) a volunteer on the occasion, and by two of the owners of the cattle.

Captain Walker lost the main trail at night, and the next day found another, which led him to what evidently was one of the principal haunts of the Apache bands living in these mountains.

His spirited action there is highly to his credit and that of his command. His own conduct is spoken of in the highest terms by all present; and his clothes, which are cut in more than one place by the Indian arrows, bear testimony of his having been in the thickest of the fight. Lieutenant Carr's gallantry before he was wounded, and his coolness afterwards, were admired by all, and the whole command did their duty in the most praiseworthy manner. Captain Walker lost one man killed, and Lieutenant Carr and the guide wounded; several of the horses were wounded—one fatally, but was brought off. The necessity of seeking surgical aid for Lieutenant Carr, whose wound was thought dangerous, if not fatal, put an end to further search for the stolen cattle, which were not at this camp. The chief and six other Indians were killed, and several wounded; but as these, with some neighboring bands of the same tribe, have been committing constant depredations on this road, I propose to send up some of the Texas volunteers and other mounted troops to drive them out of the country.

* * * * * * *

With the highest respect, your obedient servant,

PERSIFOR F. SMITH,

Brevet Major General Commanding Department.

Colonel S. COOPER,

Adjutant General.

REPORTS FROM THE DEPARTMENT OF NEW MEXICO.

[Extract.]

HEADQUARTERS DEPARTMENT OF NEW MEXICO,
Albuquerque, March 29, 1854.

COLONEL: I have the honor to report, for the information of the major general commanding the army, that a very spirited affair came off on the 5th instant, some sixty miles from Fort Union, between the Jicarilla Apaches and a detachment of the second dragoons, commanded by Second Lieutenant Bell. The parties were about equally matched as to numbers—say twenty-four warriors each—and both ready to measure their strength. The result of the conflict is, that the Indians lost five killed and many wounded, the detachment of dragoons lost two killed and four wounded. The Indians fled in great disorder to the cañons and gorges of the Canadian. This is a part of the band which captured and killed Mrs. White, and subsequently killed off the mail party near Wagon Mound. The chief most prominent in these operations—"Lobo"—was killed by Lieutenant Bell, who has certainly managed this affair with discretion and gallantry. That you may be fully informed of every particular, I send, under cover, the report of Colonel Cooke, second dragoons, together with the report of Lieutenant Bell.

* * * * * * *

I am, very respectfully, your obedient servant,
JNO. GARLAND,
Brevet Brigadier General Commanding.

Lieut. Col. L. THOMAS,
Asst. Adjt. General, Headquarters of the Army, New York.

[Extract.]

HEADQUARTERS DEPARTMENT OF NEW MEXICO,
Albuquerque, April 1, 1854.

COLONEL: I have the honor to enclose herewith, for the information of the general-in-chief, a copy of a report from Major Blake, first dragoons, very unsatisfactory as regards particulars.

The Indians, Jicarilla Apaches and Utahs, have managed to combine a force of 250 warriors, and unexpectedly attacked a company of dragoons, 60 strong, about 25 miles from Fernandes de Taos, under the command of Lieut J. W. Davidson, first dragoons, and succeeded, after a desperate conflict, in overwhelming it. Lieut. Davidson and Assistant Surgeon Magruder, both wounded, returned from the battle field with about seventeen men, most of them wounded.

The troops displayed a gallantry seldom equalled in this or any country, and the officer in command, Lieut. Davidson, has given evidence of soldiership in the highest degree creditable to him. To have sustained a deadly contest of three hours, when he was so greatly outnumbered, and then to have retired with the fragment of a company, crippled up, is amazing, and calls for the admiration of every true soldier.

To prevent further disaster, I have ordered Lieut. Col. Cooke, second dragoons, to take the field, with about 200 dragoons and a company of artillery armed with rifles.

If hostilities are continued—and I have little doubt such will be the case—I will be forced to call upon the governor of this Territory for two or three companies of volunteers.

It is very desirable that a strong mounted force, with a good supply of horses, be sent out early in the spring.

* * * * * * * *

I am, Colonel, very respectfully your obedient servant,

JNO. GARLAND,
Brevet Brigadier General Commanding.

Lieut. Col. L. THOMAS,
Asst. Adjt. General, Headquarters of the Army, New York.

HEADQUARTERS DEPARTMENT OF NEW MEXICO,
Santa Fe, April 30, 1854.

COLONEL: I have the honor to report, for the information of the major general commanding the army, that Lieut. Col. Cooke, second dragoons, on hearing of the disaster which befel the command of Lieut. Davidson on the 30th March, proceeded, with the available force at Fort Union, in the shortest possible time to Taos, where he organized a force of 200 men, and on the 4th instant marched in pursuit of the Indians, whom he overtook on the 8th on the upper branches of the Agua Calientes, and immediately gave them battle, the result of which will be found in the enclosed copy of his report. This prompt and energetic movement reflects the highest credit upon this officer, and I feel satisfied has prevented the Utahs from making common cause with the Jicarilla Apaches. It is known that the Indians lost six warriors in the affair of the 8th. It has also been ascertained that they have lost four of their chiefs since the commencement of hostilities, and nearly the whole of their animals and baggage. Their pursuit was checked for a few days by a violent storm of wind and snow, which lasted thirty hours, and very nearly paralyzed the whole command. The enemy had previously led their pursuers over the most rugged ground which troops were ever known to campaign in—the spurs of the mountain often reaching to the height of 3,000 feet, very abrupt, and covered with snow several feet in depth.

Col. Cooke is now at a small Mexican village (Rito) west of the Rio Grande, and though suffering with chills and fever, has sent out two detachments of about 140 men each, in hot pursuit, and with strong hopes of bringing the Indians to battle. Their numbers have been

reduced by desertions, wounds, and death, to about 100 warriors. That is the greatest number now assembled at any one point.

It is all-important to crush this band of *pirates*. They have too long indulged in murder and plunder to leave a hope of reformation. They do not pretend to keep good faith in *treaties* or promises. Their thorough chastisement will undoubtedly have its effect upon the contiguous tribes now looking on with deep interest for the result, and will give us assurance of many months of peace.

I have made strong efforts to bring this business to a speedy close, and will succeed if it is within the reach of possibility. Unusual and extraordinary measures have been taken to effect this desirable object, and which will be explained in another communication.

I have not as yet had a report of operations of the three companies ordered to Sierra Blanco to divert the attention of the Mezcalero from this quarter.

I am, Colonel, with great respect, your obedient servant,

JOHN GARLAND,
Brevet Brigadier General Commanding.

Lieut. Col. L. THOMAS,
Asst. Adjt. General, Headquarters of the Army, New York.

[Extract.]

HEADQUARTERS DEPARTMENT OF NEW MEXICO,
Fort Thorn, June 5, 1854.

COLONEL: I have the honor to report, for the information of the major general commanding the army, that several trains have been attacked and the mail-stage fired upon at a point in Texas not within the limits of this department, called Eagle Spring; and that I have felt it to be my duty to detach one of the companies from Fort Bliss to take post there until other arrangements could be made for the safe transportation of the mail, and also for the protection of emigrants *en route* to California.

The depredators are understood to be Mezcalero Apaches from the Sierra Blanco. This band numbers about two hundred and fifty warriors, and occupies the country between the White mountains and the Pecos river. It is my intention to send five companies into their country in the course of the present month. I am informed that they have recently committed some murders and thefts in the vicinity of Anton Chico, the lowest settlement on the Pecos. I had hoped to have brought matters to a close with the Jicarillas before entering upon my new military operations, but in this my expectations have not been fully realized.

* * * *

Most respectfully, I am, Colonel, your obedient servant,

JOHN GARLAND,
Brevet Brigadier General Commanding.

Lieut. Col. L. THOMAS,
Assist. Adjutant General, Army Headquarters, New York.

HEADQUARTERS DEPARTMENT OF NEW MEXICO.

Santa Fe, June 30, 1854.

COLONEL: In making report of the military operations against the Jicarilla Apaches under the eye and orders of Lieutenant Colonel Cooke, 2d dragoons, for the information of the general-in-chief, I will confine myself to the simple remark that all has been done which was in the power of troops to do.

I approve most cordially the manner in which Lieutenant Colonel Cooke has conducted his campaign.

The Jicarilla Apaches have been most thoroughly humbled, and beg for peace. They are dispersed in small parties with the exception of one band, which is now hard pressed by about one hundred men under Major Blake and Captain Ewell, 1st dragoons.

In order to a full understanding of the vigorous prosecution of the campaign, the difficulties encountered and overcome, I have thought it advisable to transmit the detailed reports of Lieutenant Colonel Cooke, marked A, of Brevet Major Carleton, 1st dragoons, marked B, and of Lieutenant Ransom, 1st dragoons, marked C. These officers are entitled to the highest commendation for the zeal, activity, and gallantry displayed by them in prosecuting the war; they have proven *that* to the Indians which is worth more to us than a victory; that is, they are not safe from pursuit in the most inaccessible parts of the Rocky mountains.

For the activity and zeal displayed by the junior officers, and for other interesting details, I respectfully call attention to the accompanying reports already referred to. All speak in the highest terms of praise of the Mexicans and Pueblos employed as trailers, spies, &c. Captain Quinn, who had the immediate charge of them, gave evidence throughout of sagacity and indomitable courage; the same remark will equally apply to Mr. Kit Carson, sub-agent of Indian affairs.

I will simply add, in conclusion, that one hundred and eighty men are now in the country of the Mezcalero Apaches, under the command of Brevet Lieutenant Colonel Chandler, 3d infantry. This band of Indians has been infesting the road leading from El Paso to San Antonio, committing murders and robberies; the steps which I have taken will, it is believed, put an end to their depredations in that quarter.

The Navajoes have remained quiet this year; a small party of them, renegades, stole some hundreds of sheep last month, which the nation has restored to the proper owners.

The Utahs are playing a doubtful game, and have to be watched very closely; their sympathies are all with the Jicarilla band of Apaches.

I am, Colonel, very respectfully, your obedient servant,

JOHN GARLAND,

Brevet Brigadier General Commanding Department.

Lieut. Col. L. THOMAS,

Assist. Adjt. Gen., Headquarters of the Army, New York.

[Extract.]

HEADQUARTERS DEPARTMENT OF NEW MEXICO,
Albuquerque, August 30, 1854.

COLONEL: It will be satisfactory to the commanding general to know that the Indians within the department have exhibited no hostility towards us during the present month; they, however, continue to steal animals occasionally for food, and will, of necessity, continue to do so until they are confined to some limits in which the intercourse act of 1834 can be enforced. It is next to impossible to ascertain whether or not there is any Indian country in New Mexico—consequently, the Mexican population do not hesitate to barter powder and lead with them for their stolen property. Whenever the government may think it expedient to establish limits for the several tribes, by treaty or otherwise, the Indians can be forced to occupy them in communities, as is now the case with several pueblos, the occupants of which cultivate the ground quite as well, and make more orderly citizens than many of the Mexican communities occupying frontier localities.

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I have the honor to be, very respectfully, your obedient servant,

JOHN GARLAND,
Brevet Brigadier General Commanding.

Lieut. Col. L. THOMAS,
Asst. Adjt. Gen., Headquarters of the Army, New York.

REPORTS FROM THE DEPARTMENT OF THE WEST.

[Telegraphic despatch.]

HEADQUARTERS DEPARTMENT OF THE WEST,
Jefferson Barracks, September 7, 1854.

I communicate the following despatch just received from Fort Leavenworth:

By express just arrived from Fort Laramie, Lieutenant Fleming wishes me to telegraph that, on the 18th of August an Indian (Sioux) killed an ox belonging to an emigrant train, close to Fort Laramie. The head chief reported the fact to Lieutenant Fleming, and offered to give up the offender. Brevet Second Lieutenant Grattan, with the interpreter, Sergeant Favor, Corporal McNulty, and twenty privates, were sent to receive him. The whole detachment were massacred without exception. How it occurred, Lieutenant Fleming is unable to state. No reliable information as to the number of Indians killed and wounded. The Bear, head chief, is reported killed. The Indians are hostile, menacing the fort. All the men are on duty, and Lieutenant Fleming thinks he can hold the fort, but needs more troops as soon as possible. I shall order one or two companies from Fort Riley to proceed to Fort Laramie immediately.

Respectfully, your obedient servant,

N. S. CLARKE,
Colonel Sixth Infantry, Brevet Brig. General, commanding.

Colonel S. COOPER,
Adjutant General, Washington, D. C.

FORT LARAMIE, W. T.,
September 1, 1854.

MAJOR: An occurrence has come to my knowledge since my arrival at this post, which, in my judgment, demands from me a special report, although I am informed that the main facts in the matter have already been reported to the commander of the department.

A large body of Sioux Indians, composed of the bands of the Brulés, Ogalalos, and Minicoujons, had been encamped six or eight miles below Fort Laramie for some time previous to the 19th ultimo, awaiting the arrival of the Indian agent, General Whitfield, to receive their annuities of presents. On the day previous to the date just named, an ox, belonging to a train of Mormon emigrants, was captured and killed by a Minicoujon Indian—in what manner and under what circumstances I must leave the general commanding the department to judge from the conflicting statements herewith transmitted.

On the same day that this depredation was committed, and the same that was complained of by the owner of the ox, a very influential man among the Sioux, called the Bear, chief of the band of Brulés, came to the commanding officer of Fort Laramie, Second Lieut. H. B. Fleming, 6th infantry, and reported the circumstances of the case. He said that the offender was a Minicoujon Indian, residing, for the time being, in the Brulé camp, and suggested the propriety of sending a detachment of troops to demand him; in which event, he had no doubt that the man would readily be given up, or language to that effect.

Accordingly, on the 19th of August, 1854, a party of twenty-nine enlisted men, of company G, 6th infantry, under the command of Brevet Second Lieut. John L. Grattan, of the same regiment, was ordered to bring in the Indian, if practicable, without unnecessary risks.

The Sioux encampment was situated on the north fork of the Platte, between Gratiot's trading-house, of the American Fur Company, and that of a Mr. Bordeau, which are distant five and eight miles, respectively, from Fort Laramie, following the Oregon route down the Platte. The Ogalalos and Minicoujons lay between Gratiot's house and the Brulé camp, and stretched along a mile and a half or two miles, parallel to and between the road and the river. They had to be passed, of course, in order to reach the camp of the Brulés, which lay with one extremity resting on or near the lower extremity of the Minicoujon camp, and the other on the Oregon road, in the vicinity of Bordeau's trading-house. The Brulé camp was semi-circular in figure, having its convexity towards the river, and having in the rear of it a slight but abrupt depression in the ground, partially overgrown with bushes.

Lieutenant Grattan left the fort about 3 o'clock p. m., with his party, and an interpreter, for the Brulé camp. Arrived at Gratiot's, he halted, and caused his small-arms to be loaded, without capping. He then proceeded about two miles further—that is to say, near the upper extremity of the Brulé camp—and halted again to load two pieces of artillery, (a 12-pounder howitzer and a mountain howitzer,) with which he had been provided. He here explained to the party the nature of the service to be performed, and how it was to conduct itself; then, resuming his march, he moved on to Bordeau's house, sent for Mr. Bordeau himself, and requested him to go for the chief above named, called the Bear, with the view to availing himself of the authority and influence of that Indian for the accomplishment of his mission. The Bear came, but could not or would not deliver up the accused Minicoujon, and Lieutenant Grattan was, therefore, compelled to seek and take by force, if need be, the offender, or submit to the mortification of retiring without having accomplished the object of his mission; and rather than do this, he resolved boldly to enter the Brulé camp and take the Indian at all hazards—having previously informed himself of the precise locality of the offender. This was nearly in the centre of the camp, and not far from the lodge of the Bear.

Up to this moment all the statements, verbal and written, which I have been able to obtain, substantially agree; but as to what transpired immediately after, there is much confusion, contradiction, and uncertainty, owing, doubtless, to the conflicting interests, prejudices, and predilec-

tions of the spectators of the same, and to the hurried and confused movement of events ever incident to crises of danger. That which appears certain is, that so soon as Lieut. Grattan commenced his movement into the Brulé camp, the younger warriors, not only of that band, but of the whole Sioux camp, commenced preparing to resist the capture of the Minicoujon depredator by assembling in brushwood and behind the bank, before alluded to as characterizing the ground in the rear of the Brulé village. Not only this, but the old men, in council, clamored for delay, thereby indicating that they were unable to restrain their warriors, or that they were playing into their hands by giving them time for preparation. Lieutenant Grattan doubtless imagined that these indications were all unfavorable to the object of his expedition, and determined to bring the matter to an issue at once by submitting the alternative of an immediate surrender of the offending Minicoujon, or instant hostilities against the Brulés. The result proves what must have been the reply of the Indians; for, although it is impossible to ascertain which party struck the first blow, it is positively established beyond all contradiction that the troops had scarcely time to make a single discharge of their small-arms and the two pieces of artillery they carried with them, before their commander and a large portion of their numbers were struck dead upon the ground they occupied. Those who escaped instant slaughter, after making a fruitless effort to disengage themselves from the net-work formed by a thousand or fifteen hundred warriors, fell fighting, individually or in small parties, until the whole detachment was, in the forcible Indian phraseology, completely "wiped out"—but one man having escaped, with great difficulty, to the fort, and he died in two or three days afterwards of his wounds.

* * * * *

I have the honor to be, Major, your obedient servant, &c.,

O. F. WINSHIP, *A. A. G.*

Brevet Major F. N. PAIGE, *Asst. Adjt. Gen. U. S. A.,*
Headquarters Department of the West, Jefferson Barracks, Mo.

INSTRUCTIONS RESPECTING MILITARY ROADS.

WAR DEPARTMENT,
Washington, August 2, 1854.

SIR: Pursuant to an act of Congress recently passed, the military road from Camp Stewart to the mouth of Myrtle creek, on Umpqua river, is to be extended to Scottsburgh, and an appropriation of $20,000 has been made to defray the cost of construction. This sum will be placed to your credit with the assistant treasurer at San Francisco, and you are hereby placed in charge of the work.

Your object will be first to secure a practicable wagon-road between the points indicated, and then to devote the remainder of the funds at your disposal to the improvement of the most difficult places, aiming to make the road uniformly good throughout its length.

You are authorized to have the work done by contract, or to employ hands for the purpose. The former is believed to be the preferable mode, particularly if persons residing along the line, and thus interested in the success of the work, are willing to undertake it at moderate rates.

You will render your accounts to this department as early as practicable after the expiration of each quarter.

Very respectfully, your obedient servant,

JEFF'N DAVIS,
Secretary of War.

Lieut. JOHN WITHERS,
4th Infantry, Fort Vancouver, Washington Territory.

WAR DEPARTMENT,
Washington, September 19, 1854.

SIR: By an act approved the 17th of July last, an appropriation of $25,000 was made for "the construction of a military road within the Territories of New Mexico and Utah, commencing at Great Salt Lake City, Parowan, and Cedar City, to the eastern boundary of California, in the direction of Cajon Pass." It has been determined to have the work done by contract, and to intrust to you the duty of making the necessary contracts.

The amount of the appropriation, it is presumed, will not be more than sufficient to overcome the principal difficulties along the route indicated. From the best information the department can obtain, it is supposed there will be encountered, at a certain point south of Cedar City, at the jornada commencing at Muddy creek, and another terminating at the Mohave river, and in the passage of the mountains near the head of the Santa Clara; but you will have opportunities of obtaining more full and reliable accounts respecting the route, before entering on the execution of these instructions. After informing yourself as fully

as possible on the subject, you will make contracts with responsible parties for the construction of a practicable wagon-road at these and all other difficult places, bearing in mind that the object is to obtain the best road that the money will make over the whole route.

For a work of this kind, it is not expected there will be any competing bidders; but, on the contrary, you may find it difficult to find proper persons to take contracts. In such circumstances, persons residing on the line of the road, or otherwise interested in its completion, have been found to offer the best terms; and as this work must be of importance to the inhabitants of all the places mentioned in the act, the governor of the Territory or other prominent citizens will, no doubt, afford you efficient aid in finding reliable persons to undertake it.

Contractors would of course prefer to receive payment as the work progresses; and as they would thus avoid, in great part, the necessity of borrowing money, or using their own means to pay wages and furnish supplies to laborers, they could do much more for a given amount, so paid, than for the same sum withheld till the completion of the work. The department would therefore be willing to adopt this course, if it could be done with perfect safety; but the money cannot legally be advanced to contractors, nor can an officer be detailed to superintend the work and make payments, while the employment of a civil agent would perhaps cost almost as much as would be saved by making the payments promptly. It is possible, however, that you will be able to make some safe arrangements to avoid the long delay which will be incurred if payment be withheld until the entire work be finished and inspected; but if no such arrangement can be made, you will, in making the contracts, stipulate for payments to be made only after the completion of the work and inspection by an officer to be detailed for the purpose.

Very respectfully, your obedient servant,

JEFF'N DAVIS,
Secretary of War.

Brevet Lieut. Col. E. J. STEPTOE.

WAR DEPARTMENT,
Washington, November 28, 1854.

SIR: By an act approved July 17, 1854, the following appropriations are made for the construction and repair of roads in the Territory of New Mexico, viz: from Taos to Santa Fe $20,000, and from Santa Fe to Doña Ana, including the sinking of wells if required, $12,000. You are hereby charged with the execution of these works.

As indicated by the terms of the appropriation act, the want of water is one of the difficulties to be overcome on the route last mentioned, and your attention will be first directed to that object. It is believed that the readiest and cheapest mode of procuring water will be by sinking artesian wells, and for that purpose the apparatus procured to make examinations in connexion with the exploration of railroad route to the Pacific, will, when no longer required on that work, be turned over to you at Santa Fe.

When, as in these cases, a comparatively small amount of money is appropriated for a long line of road, the department has directed that the road be first rendered practicable for wagons through its entire length, and that the remainder of the appropriation be expended on the more difficult portions of it, so as to render the whole as uniform as possible. You will pursue this plan in executing the work now intrusted to you.

It is deemed best to have the work done by contract if practicable, and in making contracts for the purpose, to endeavor to have them taken by persons residing near the line of the road, or otherwise personally interested in its completion, stipulating either for the execution of a specified quantity of work, or, what perhaps is preferable, for the completion of a certain portion of the road, payment being subject to your approval of the work.

You will consult freely with the commanding officer of the department in regard to the location and construction of the roads.

The amount of the above-mentioned appropriations will be placed at your credit with the assistant treasurer at St. Louis, Missouri.

Very respectfully, your obedient servant,

JEFF'N DAVIS,
Secretary of War.

Captain E. P. SCAMMON,
Corps Top. Engs., Santa Fe, New Mexico.

REPORT ON THE CAPITOL EXTENSION.

OFFICE EX. U. S. CAPITOL AND WASHINGTON AQUEDUCT,
October 12, 1854

SIR: I have the honor to report the progress of the works for the extension of the United States Capitol.

At the date of my last annual report the walls of the basement story had been raised, and on the south wing two-thirds of the arches supporting the principal floor had been turned; those of the north wing had been commenced.

The limit to the rapidity of building was then stated to be the possibility of getting marble.

The contractors for marble afterwards objected to supplying marble of such dimensions as were thought proper for the work, maintaining that their contract bound them to furnish for the ashlar only blocks of 9 to 18 inches bed.

Upon your recommendation to the Committee of Public Buildings, a law was passed by Congress giving authority to make a supplemental contract to obtain the marble in larger blocks, and to procure the columns with monolithic shafts. A copy of this contract accompanies this report.

The quantity of marble thus far delivered has not been sufficient to carry on the work as rapidly as I could desire, and as the funds appropriated by Congress would justify, but I presume that the contractors have done all that the price allowed them enabled them to do.

The marble is quarried in Berkshire county, Massachusetts, transported ninety miles by railroad to Bridgeport, and thence shipped to this port. This complicated operation is liable to many interruptions and delays. Lately the arrangements of the contractors having been improved by experience, the delivery of marble has been more rapid, and I hope to accumulate a supply which will enable the contractors to keep the large force now at work employed all winter. At the date of my last report 75,659 cubic feet of marble had been delivered, which had cost $109,661 21.

From that time to 4th October, 1854, there were received 48,968 cubic feet, costing $78,518 18.

There are now on hand 35,758 cubic feet, or 1,321 blocks of marble, of which 695 blocks, or 17,261 cubic feet, are worked and ready to be set in the walls; and the remainder, 626 blocks, or 18,476 cubic feet, are either in the rough or in the shop partly finished.

The supply has been somewhat irregular, which prevented the contractors from employing a very large force until lately. They have now about 250 men employed in cutting, rubbing, and setting the marble.

The whole of the masonry of the basement story of both wings is now completed, and the marble facing of a portion of the principal

story is carried to the top of the window-jambs; none of these jambs are yet completed. They are now in hand; and as they are very elaborately carved, some two months' work being applied to each one, it will be some time before they can all be set. About thirty carvers are employed upon them, and the force is being increased as good workmen can be obtained. The carving of the pilaster capitals has also been commenced.

The interior walls have all been carried up to the spring of the roofing arches of the attic story: a portion of these arches have been closed.

The walls of the Representatives and Senate halls are at their full height, and the setting of the iron bed-plates for the roof has commenced.

The construction of the roof is commenced, and during the remainder of the season I expect to get the Representatives and Senate halls roofed over.

Up to 30th September, 1853, there had been paid on Provest & Winter's contract for marble work	$101,155 35
Since then, including first payment in October	87,752 77
Total to 30th September, 1854	188,908 12

Amount paid to Rice, Baird & Heebner for marble, to 30th September, 1853	$109,661 25
Amount paid since then, including first payment in October, 1854	78,518 18
	188,179 43

The number of days-work during the year has been 101,070. The number of bricks received has been 9,037,601, costing $70,246 89. Of these there have been laid in the walls and arches of the south wing 3,476,218; and of the north wing 4,441,483: we have on hand 1,119,900.

I hope during the next season to complete the body of both wings, and to commence the construction of the porticoes.

If the contractors for marble supply the material as fast as they have engaged to, I see no reason to prevent the next Congress meeting within the walls of the new halls.

Cash account.

Amount available 30th September, 1853	$781,816 49
Amount appropriated 4th March, 1854	750,000 00
	1,531,816 49
Amount expended during year ending 30th September, 1853	449,685 82
Amount available 30th September, 1854, viz: in treasury, undrawn	$1,045,000 00

Amount deposited with Treasurer at Washington, and assistant treasurers at New York and Philadelphia.....	$36,072 55	
Amount in hand of agent.....	1,058 12	
		$1,082,130 67

The following appropriations have been made for the extension of United States Capitol, viz:

Appropriation of 30th September, 1850.....	$100,000 00
Joint resolution of 14th April, 1852.....	500,000 00
Deficiency bill for year ending 30th June, 1853.....	400,000 00
General appropriation bill for year ending 30th June, 1854.....	600,000 00
General appropriation bill for year ending 30th June, 1855.....	750,000 00
	2,350,000 00

Of which there has been expended $1,267,869 33; leaving available for the fiscal year ending 30th June, 1855, $1,082,130 67.

For the service of the year ending 30th June, 1856, there will be required the sum of $325,000.

Respectfully submitted:

M. C. MEIGS,

Capt. Eng., in charge Ex. U. S. Capitol and Washington Aqueduct.

Hon. JEFFERSON DAVIS, *Secretary of War.*

Agreement between the United States of America, of the first part, by Capt. Montgomery C. Meigs, of the corps of engineers, acting under the authority of and for and in behalf of the said United States in the erection of the extension of the Capitol; and John Rice and Charles Heebner, all of Philadelphia county, in the State of Pennsylvania, under the style and title of Rice, Baird, and Heebner, of the second part, witnesseth:

That, whereas the United States, by Thomas U. Walter, architect, did on the 17th day of January, 1852, enter into contract with John Rice, John Baird, Charles Heebner and Matthew Baird, for all the marble required for the exterior of the extension of the United States Capitol, according to certain specifications attached to and forming part of that contract; and whereas, by the twenty-fifth article of said specifications, the ashlar work throughout the building was to have beds of from nine to eighteen inches, and by the eleventh article of said specifications the frusta of the column shafts were not to be less than four feet in height; and whereas it is desired by the United States to procure the ashlar work with larger beds than provided in these specifications, and the columns with monolithic shafts if possible; and whereas, by a joint resolution of Congress, approved on the first day of March, 1854, the President is authorized to cause a supplemental contract to be made with the contractors for the marble for the Capitol

extension, to procure the columns and ashlar in larger blocks than required by the specifications of their present contract:

The parties of the second part, in consideration of the matters herein set forth, covenant and agree to and with the party of the first part to furnish and deliver at the proper cost of the said parties of the second part, on the grounds of the extension of the United States Capitol, all the marble for the exterior of said extension, in blocks of such size, not exceeding 120 (one hundred and twenty) cubic feet net, as may be from time to time ordered by the party of the first part; and to deliver for the 100 (one hundred) columns of the exterior porticoes as many monolithic shafts as their quarry may prove capable of furnishing, and the remainder of the whole number required in two blocks each, one of which to form two-thirds of the whole length of each shaft.

The party of the first part, in consideration of the premises, agrees to pay the parties of the second part at the rate of one dollar and ninety-eight cents per cubic foot for all the blocks of marble for the exterior which exceed eighteen inches bed, and at the rate of fourteen hundred dollars for each monolithic column shaft for the exterior porticoes, and eleven hundred dollars for each shaft delivered in two pieces, as above specified, for the columns of the same.

And it is expressly understood, that the contract of the 17th January, 1852, remains in full force as to all its provisions and conditions excepting so far as they are modified, as to the size and price of the blocks, by this supplemental contract:

Provided, however, that in case the officer or agent of the United States, in charge of the Capitol extension for the time being, shall at any time be of opinion that this contract is not duly complied with by the parties of the second part, or that it is not in due progress of execution, or that the said parties of the second part are irregular or negligent in the performance of this contract, in such case he shall be authorized to declare this contract forfeited, and thereupon the same shall become null, as far as it regards the party of the first part; and the parties of the second part shall have no appeal from the opinion and decision aforesaid, and they hereby release all right to except to or question the same in any place, or under any circumstances whatever; but the parties of the second part shall still remain liable to the party of the first part for the difference between the prices stipulated in this contract, and the prices the said party of the first part may have to pay for the marble required to finish the work, as well as for all other damages occasioned to the said United States by such non-compliance, irregularity or negligence:

And provided, also, that in order to secure the punctual and faithful performance of the covenants made by the parties of the second part by these presents, and to indemnify and protect the party of the first part from loss in case of default and forfeiture of this contract, the said party of the first part shall be authorized to retain in its hands until the completion of the contract, ten per cent. on the amount of moneys at any time due to the said parties of the second part, until the moneys thus retained, together with what may have been retained on the original contract, shall amount to fifteen thousand dollars, after which the marble subsequently delivered shall be paid for in full on delivery,

leaving the aforesaid fifteen thousand dollars in the possession of the party of the first part until the completion of the contract.

And it is hereby expressly understood by the contracting parties, that all the marble is to be delivered in the rough, except the column blocks mentioned and provided for herein, and that the dimensions, with the usual allowance for the dressing of all the blocks required for the work, are to be furnished from time to time by the aforesaid party of the first part; and that said dimensions are to constitute the measurement on which payment is to be made, without allowance for any surplus over and above the sizes thus given. And further, that the parties of the second part are to have all the column blocks scabbled round to dimensions at their own proper cost.

And it is further stipulated and agreed, that no member of Congress shall be admitted to any share or part of this contract or agreement, or to any benefit to arise therefrom; and this contract shall be in all its parts subject to the terms and requisitions of an act of Congress, approved on the 21st day of April, 1808, entitled "An act concerning public contracts."

It is also expressly understood and agreed by and between the parties hereto, that if Congress should at any time fail to make the appropriations necessary to carry on the said work, that then and in such case the execution of this contract shall be suspended until such appropriations shall be made, without thereby creating any claim on the United States by the said contractors.

It is expressly understood that this contract is not to be binding upon either party until it receives the approval of the Secretary of War.

And for the true and faithful performance of all and singular the covenants, articles and agreements, hereinbefore particularly set forth, the subscribers hereunto bind themselves, jointly and severally, their and each of their successors, heirs, executors and administrators.

Thus covenanted and agreed by us, the parties aforesaid, in the city of Washington, this thirtieth day of March, 1854; as witness our hands and seals.

M. C. MEIGS, [L. S.]
Captain Engineers.
JOHN RICE. [L. S.]
CHARLES HEEBNER. [L. S.]

Signed, sealed, and delivered in presence of—
(the words "John Baird and Matthew Baird" struck out of the seventh line, first page, and the words "under the style and title of Rice, Baird and Heebner," interlined between eighth and ninth lines, first page, before signature; also the word "and" inserted after "John Rice," sixth line, same page, before signature)—
Z. W. DENHAM,
W. J. FITZPATRICK.

Approved: JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *April* 19, 1854.

Know all men by these presents, that we, William Struthers and John Baird, marble-masons, of the city of Philadelphia, State of Pennsylvania, are held and firmly bound unto the United States of America in the full and just sum of twenty thousand dollars, lawful money of the United States, to be paid to the said United States, or to its proper agent or attorney, duly authorized to receive the same, to which payment well and truly to be made and done we bind ourselves and every of us, our and every of our heirs, executors, and administrators, in the whole and for the whole, jointly and severally, firmly by these presents: sealed with our seals, and dated this eighteenth day of April, anno Domini one thousand eight hundred and fifty-four.

The condition of the above obligation is such, that if John Rice and Charles Heebner, their heirs, executors, or administrators, do and shall well and truly execute a contract which they the said John Rice and Charles Heebner have entered into with Captain Montgomery C. Meigs, of the United States corps of engineers, for and in behalf of the United States, by which they have contracted to furnish and deliver, at their own proper cost, all the marble and column shafts for the exterior of the extension of the United States Capitol at Washington, conforming in all respects to the terms and conditions of said contract, then the foregoing obligation to be void and of none effect; otherwise to remain in full force and virtue in law.

WM. STRUTHERS. [SEAL.]
JOHN BAIRD. [SEAL.]

Signed, sealed, and delivered in presence of—
(the words "John Baird and Matthew Baird" struck out of the 18th and 19th lines, 1st page, before signature)—
THOS. BIRCH.

I certify that I am acquainted with William Struthers and John Baird, of the city of Philadelphia, State of Pennsylvania, the sureties named in the above bond, and that they are severally freeholders and residents of said city, and in my opinion sufficient sureties for the purposes mentioned in the within bond.

CHAS. BROWN, *Collector.*

REPORT OF THE COMMANDING GENERAL.

HEADQUARTERS OF THE ARMY,
New York, November 18, 1854.

SIR: I beg to offer the following professional suggestions on matters touching the "discipline and military control" of the army, with which (and in those terms) I am charged by the army regulations.

In my last annual report (Ex. Doc. 1, House of Representatives, 33d Congress, 1st session, pp. 96, 97,) I invited attention to the dispersed condition of the troops as being highly unfavorable to instruction and discipline, and suggested that something might be done to improve the *morale* of the army, by—

1. A revision of the rules and articles of war incorporating a system of *rewards with* punishments, harmonizing material discrepancies, the result of many hasty enactments, and more clearly defining rights and duties, as well as crimes, and affixing definite and appropriate punishments according to the nature and degree of the offences.

2. A radical change in the system of recruiting, which would leave, with every regiment, (by dividing it into *service* and *depôt* companies, alternating in duty,) the filling up its own ranks, and thus establishing an early acquaintance and sympathy between officers and non-commissioned officers and their men.

3. A retired list for superannuated and disabled officers, recommended with much force by many administrations, and always favorably reported upon by the military committees of the two houses of Congress; and,

4 Placing the pensions of the army on the same footing with those of the navy.

Reflection and experience have strengthened the conviction that such measures would much improve the well-being and efficiency of the army. To that end Congress, at its last session, gave additional pay to enlisted men, and authorized promotion to commissions from the ranks, enactments which will, no doubt, heighten the moral condition of our non-commissioned officers and privates. Something more, however, is still needed to secure the enlistment of a sufficient number of young men of respectable character and attainments (for promotion to lieutenancies) under the standard (not too high) established by the War Department. I allude to the suggestions above, and more particularly to the revision of the code, including a fence of law around the rights of inferiors, beginning with privates, against caprice and violence on the part of authority. Such is the circle of ameliorations I beg earnestly to recommend in order to render the military career eligible from the beginning, and to give to the whole army the highest efficiency.

During the past year, the troops in the department of the West, the dpartment of Texas, the department of New Mexico, and the depart-

ment of the Pacific, have been most actively engaged in endeavoring to protect our settlements on the Indian borders, and emigrants passing through the Indian country. The bad feeling shown by many of the Indian tribes, and continued acts of open hostility on the part of others, have cost our small detachments much arduous service, with severe sufferings, including the loss of many valuable officers and men. With them the campaigns hardly ever intermit; and although the conflicts have been on a small scale, our troops on every occasion have displayed a noble zeal and daring, which seem to me worthy of being better known and better rewarded. I have, heretofore, presented the names of a few of the more distinguished officers in these combats for brevets. The number might now, perhaps, be doubled. This reward of merit, though cheap to the government, is always coveted by the noblest spirits. At least it is hoped that the number of our regiments in the presence of active, numerous, hostile, and treacherous bands, may at length be sensibly increased, in order to secure the defence and protection contemplated, and with, on our part, *a smaller sacrifice of life*, which is always greatest with inadequate numbers, even when most triumphant. This is an argument dictated by humanity, and policy is equally on the side of a considerable augmentation; for there is not a petty tribe in the interior that does not believe itself—judging from the handfuls of troops we exhibit here and there—equal in numbers to the people of the United States.

With four (perhaps three) additional regiments, most of the small posts on Indian borders might be withdrawn, and the troops, in battalions, held in good strategical positions. When at rest, instruction and discipline would be advanced, and each battalion, leaving a small guard behind, might, in column, composed of at least a portion of cavalry, be instructed to make an annual circuit through the nearest Indian country—always seen in a condition to pursue and to strike—in order to overawe hostile machinations, and to punish violations of peace. Similar views have often been presented in my annual reports, beginning with 1842; but, from the want of troops, they have been only partially put into practice.

It is with some diffidence that I beg a renewed consideration of another subject that received the favor of the War Department in its last annual report. I allude to *the pay of army officers.*

Out of the service, it does not seem to be understood or felt that the successes of the United States in the recent war against Mexico, by flooding the country with gold and prosperity, and thence bringing about an enormous increase in the price of every necessary and comfort of life, has, practically, imposed a tax (by that increase) of forty dollars in every hundred on the annual pay and emoluments of the officers who won those successes! (The enlisted men, it has been seen, have had their proportionate augmentation of pay.)

I have the honor to remain, with high respect, your most obedient servant,

WINFIELD SCOTT.

Hon. J. DAVIS,
Secretary of War, Washington, D. C.

A.—*Organization of the regular*

	Major general.	Brigadier generals.	Adjutant general.	Assistant adjutant general (lieutenant colonel.)	Assistant adjutants general (majors by brevet.)	Assistant adjutants general (captains by brevet.)	Judge advocate.	Inspectors general.	Quartermaster general.	Asst. quartermasters general.	Dep. quartermasters general.	Quartermasters.	Assistant quartermasters.	Commissary general of subsistence.	Assistant commissary general of subsistence.	Commissaries of subsistence (majors.)	Commissaries of subsistance, (captains.)	Surgeon general.	Surgeons.	Assistant surgeons.	Paymaster general.	Deputy paymasters general.	Paymasters.
General officers	1	2	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
Aids-de-camp to general officers	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
Adjutant general's department	..	..	1	1	*4	*8	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
Judge advocate's department	..	..	..	....	....	....	*1	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
Inspector general's department	..	..	..	....	....	....	..	2	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
Quartermaster's department	..	..	..	....	....	....	..	..	1	2	2	§5	*28	..	....	....	....	..	..	..	..	..	..
Subsistence department	..	..	..	....	....	....	..	..	..	..	..	..	....	1	1	2	*8	..	..	..	..	..	..
Medical department	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	1	22	72	..	..	..
Pay department	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	1	2	25
Corps of engineers	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
Corps of topographical engineers	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
Ordnance department	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
1st regiment of dragoons	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
2d regiment of dragoons	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
Aggregate of dragoons	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
Regiment of mounted riflemen	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
1st regiment of artillery	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
2d regiment of artillery	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
3d regiment of artillery	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
4th regiment of artillery	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
Aggregate of artillery	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
1st regiment of infantry	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
2d regiment of infantry	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
3d regiment of infantry	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
4th regiment of infantry	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
5th regiment of infantry	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
6th regiment of infantry	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
7th regiment of infantry	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
8th regiment of infantry	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
Aggregate of infantry	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
Non-commissioned staff unattach'd to regiments	..	..	..	....	....	....	..	..	..	..	..	..	....	..	....	....	....	..	..	..	..	..	..
Grand aggregate	1	2	1	1	*4	*8	*1	2	1	2	2	§5	*28	1	1	2	*8	1	22	72	1	2	25

*2 of the 4 assistant adjutants general, (majors by brevet,) 2 of the 8 assistant adjutants general, (captains by brevet,) 3 of the 28 assistant quartermasters, and 3 of the 8 commissaries of subsistence, (captains,) belonging also to regiments, and being reported in the strength thereof, to avoid counting them *twice*, are excluded as *staff* officers from the columns "total commissioned" and "aggregate" of their respective departments. The regimental and staff commissions held by these officers are of *unequal* grades, and hence they are not affected by the provisions of the 7th section of the act of June 18, 1846. The like remark is applicable to the *judge advocate* of the army, who is also a captain in the ordnance department.

† The 4 aids-de-camp being taken from regiments and reported in the strength thereof, to avoid counting them *twice*, are excluded as *staff* officers from the columns "total commissioned" and "aggregate."

‡ The adjutants of artillery and infantry, (12,) and *all* the regimental quartermasters, (15,) being taken from the subalterns, and accounted for in their several regiments as belonging to companies, are excluded as regimental *staff* officers from the columns "total commissioned" and "aggregate."

§ Under the act of July 19, 1848, section 3, vacancies in the grade of quartermaster cannot be filled until the number of quartermasters be reduced to 4.

‖ Under the 4th section of the act of April 29, 1812, "making further provisions for the corps of engineers," 1 brevet 2d lieutenant is allowed for every company. The number authorized is, consequently, 159. The number now attached to the army is 58.

¶ By the act of April 5, 1832, section 2, "providing for the organization of the ordnance department," the number of ordnance sergeants cannot exceed "1 for each military post." The number actually in service is 72.

** 2 companies in each of the 4 regiments of artillery being equipped as light artillery, are allowed, in consequence thereof, "64" instead of 42 privates. See act "to increase the rank and file of the army, &c.," approved June 17, 1850, section 1.

army of the United States—1854.

Colonels.	Lieutenant colonels.	Majors.	Captains.	Aids-de-camp.	Adjutants.	Regimental quartermasters.	First lieutenants.	Second lieutenants.	Brevet second lieutenants.	Military storekeepers.	Sergeant majors.	Quartermaster sergeants.	Principal or chief musicians.	Chief buglers.	¶ Ordnance sergeants.	Sergeants.	Corporals.	Buglers.	Musicians.	Farriers and blacksmiths.	Artificers.	‡‡ Privates.	Enlisted men of ordnance.	Total commissioned.	Total enlisted.	Aggregate.
..	....	....	....	..	....	....	....	....	....	..	..	..	..	..	....	....	....	..	....	..	..	.....	....	3	.....	3
..	....	....	....	†4	....	....	....	....	....	..	..	..	..	..	....	....	....	..	....	..	..	.....	....	.....	.....	.....
..	....	....	....	..	....	....	....	....	....	..	..	..	..	..	....	....	....	..	....	..	..	.....	....	10	.....	10
..	....	....	....	..	....	....	....	....	....	..	..	..	..	..	....	....	....	..	....	..	..	.....	....	.....	.....	.....
..	....	....	....	..	....	....	....	....	....	..	..	..	..	..	....	....	....	..	....	..	..	.....	....	2	.....	2
..	....	....	....	..	....	....	....	....	....	2	..	..	..	..	....	....	....	..	....	..	..	.....	....	37	.....	37
..	....	....	....	..	....	....	....	....	....	..	..	..	..	..	....	....	....	..	....	..	..	.....	....	9	.....	9
..	....	....	....	..	....	....	....	....	....	..	..	..	..	..	....	....	....	..	....	..	..	.....	....	95	.....	95
..	....	....	....	..	....	....	....	....	....	..	..	..	..	..	....	....	....	..	....	..	..	.....	....	28	.....	28
1	2	4	††14	..	....	....	12	10	‖4	..	..	..	..	..	....	10	10	..	2	..	..	78	....	47	100	147
1	1	4	††14	..	....	....	10	6	‖5	..	..	..	..	..	....	....	....	..	....	..	..	.....	....	41	.....	41
1	1	4	††14	..	....	....	12	4	‖3	15	..	..	..	..	....	....	....	..	....	..	..	.....	250	54	250	304
1	1	2	10	..	1	‡1	10	10	‖3	..	1	1	1	2	....	40	40	20	....	10	..	500	....	38	615	653
1	1	2	10	..	1	‡1	10	10	‖4	..	1	1	1	2	....	40	40	20	....	10	..	500	....	39	615	654
2	2	4	20	..	2	‡2	20	20	‖7	..	2	2	2	4	....	80	80	40	....	20	..	1,000	....	77	1,230	1,307
1	1	2	10	..	1	‡1	10	10	‖2	..	1	1	1	2	....	40	40	20	....	20	.	640	....	37	765	802
1	1	2	12	..	‡1	‡1	24	12	....	..	1	1	..	..	....	48	48	..	24	..	24	**548	..	52	694	746
1	1	2	12	..	‡1	‡1	24	12	‖2	..	1	1	..	..	....	48	48	..	24	..	24	**548	..	54	694	748
1	1	2	12	..	‡1	‡1	24	12	‖3	..	1	1	..	..	....	48	48	..	24	..	24	**548	....	55	694	749
1	1	2	12	..	‡1	‡1	24	12	....	..	1	1	..	..	....	48	48	..	24	..	24	**548	....	52	694	746
4	4	8	48	..	‡4	‡4	96	48	‖5	..	4	4	..	..	....	192	192	..	96	..	96	**2192	....	213	2776	2989
1	1	2	10	..	‡1	‡1	10	10	‖4	..	1	1	2	..	....	40	40	..	20	..	..	420	....	38	524	562
1	1	2	10	..	‡1	‡1	10	10	‖5	..	1	1	2	..	....	40	40	..	20	..	..	420	....	39	524	563
1	1	2	10	..	‡1	‡1	10	10	‖4	..	1	1	2	..	....	40	40	..	20	..	..	420	....	38	524	562
1	1	2	10	..	‡1	‡1	10	10	‖4	..	1	1	2	..	....	40	40	..	20	..	..	420	....	38	524	562
1	1	2	10	..	‡1	‡1	10	10	‖4	..	1	1	2	..	....	40	40	..	20	..	..	420	....	38	524	562
1	1	2	10	..	‡1	‡1	10	10	‖3	..	1	1	2	..	....	40	40	..	20	..	..	420	....	37	524	561
1	1	2	10	..	‡1	‡1	10	10	‖5	..	1	1	2	..	....	40	40	..	20	..	..	420	...	39	524	563
1	1	2	10	..	‡1	‡1	10	10	‖3	..	1	1	2	..	....	40	40	..	20	..	..	420	....	37	524	561
8	8	16	80	..	‡8	‡8	80	80	‖32	..	8	8	16	..	....	320	320	..	160	..	..	3360	....	304	4192	4496
..	....	....	....	..	....	....	....	....	....	..	..	..	..	..	¶72	....	....	..	....	..	..	.....	....	....	72	72
18	19	42	††200	†4	‡15	‡15	240	178	‖58	17	15	15	19	6	¶72	642	642	60	258	40	96	‡‡7270	250	957	9385	10342

†† By the act of March 3, 1853, section 9, a lieutenant of engineers, topographical engineers, or ordnance corps, having served continuously 14 years, is entitled to promotion to the grade of captain, but this does not increase the number of officers in the several corps.

‡‡ By the act of June 17, 1850, above cited, (note **,) section 2, the President is authorized, whenever the exigencies of the service require it, to increase to 74 the number of privates in any company "serving at the several military posts on the western frontier, and at remote and distant stations." In the table the minimum or fixed organization is given, viz: 50 privates to a company of dragoons, 64 to a company of light artillery and riflemen, and 42 to the artillery and infantry. Under the authority conferred upon him, the President has directed that the number of privates be carried up to 74 in the several companies serving in the peninsula of Florida, in Texas, New Mexico, California, and Oregon, as well as those at Forts Snelling and Ripley, on the Upper Mississippi, Fort Ridgely, on the Minnesota river, Fort Riley, on the Kanzas, Fort Arbuckle, on the False Washita river, and Forts Kearny and Laramie, on the Oregon route. There are at this time 135 companies serving at, or in route to, these distant stations, viz: all the companies of the 3 cavalry regiments, (30,) all those of the 8 infantry regiments, except 4 companies of the 7th regiment, (76,) and 29 companies of artillery: 6 of these last belong to the 1st regiment, 8 to the 2d, 11 to the 3d, and 4 to the 4th regiment. The authorized increase in the number of privates is, therefore, 3,874, making the "total enlisted" (as the troops are now posted or in route) 13,259, and the aggregate 14,216. If *all* the companies belonging to regiments, (158,) were serving at the distant stations described, the additional number of privates allowed would then be 4,500, thus increasing the "total enlisted" to 13,885, and the aggregate 14,842.

S. COOPER, *Adjutant General.*

ADJUTANT GENERAL'S OFFICE, *Washington, November* 21, 1854.

B.—*Position and distribution of the troops in the Department of the Colonel 2d artillery—Head-*

POSTS.	SITUATION.	COMMANDING OFFICERS.	GARRISONS. Number of companies.	GARRISONS. Regiments.
				Department staff.....
Fort Brady.....	Sault de Ste Marie, Mich.	Capt. F. N. Clarke, 4th artillery	1	4th artillery.....
Fort Mackinac.....	Michilimackinac, Mich...	Capt. and Bvt. Major T. Williams, 4th artillery.	1	4th artillery.....
Fort Ontario.....	Oswego, N. Y.....	Capt. J. P. McCown, 4th artillery	1	4th artillery.....
Fort Independence....	Boston harbor, Mass.	Capt. and Brevet Major J. B. Scott, 4th artillery.	2	4th artillery.....
Fort Hamilton.....	Narrows, N. York harbor	Maj. W. W. Morris, 4th artillery	2	4th artillery.....
Fort Lafayette.....				
Carlisle Barracks	Carlisle, Pa.....	Col. and Bvt. Brig. Gen. E. A. Hitchcock, 2d infantry.	2	2d infantry.....
Headquarters 4th artillery.	Baltimore, Md.....	Col. and Bvt. Brig. Gen. J. B. Walbach, 4th artillery.	..	.....
Fort McHenry.....	Baltimore harbor, Md.	Lieut. Col. and Bvt. Col. J. L Gardner, 1st artillery.	2	1st and 2d artillery...
Fort Monroe..... ...	Old Point Comfort, Va...	Col. J. B. Crane, 1st artillery...	4	1st artillery.....
Fort Moultrie.....	Charleston harbor, S. C..	Maj. and Bvt. Col. J. Dimick, 1st artillery.	2	1st artillery.....
Fort Capron.....	Indian river, Fla.	Capt. and Bvt. Maj. J. A. Haskin, 1st artillery.	1	1st artillery.....
Key West Barracks...	Key West, Fla.....	Capt. J. Vogdes, 1st artillery...	1	1st artillery.....
Fort Myers.....	Caloosahatchee, Fla.....	Capt. H. C. Pratt, 2d artillery..	3	2d artillery.....
Fort Meade	Pea creek, Fla.	Capt. and Bvt. Maj. L. G. Arnold, 2d artillery.	3	2d artillery.....
Fort Brooke	Tampa, Fla.....	Maj. and Bvt. Col. J. Munroe, 2d artillery.	..	Detachment.....
Fort Pickens.....	Pensacola harbor, Fla.	.....	..	.....
Fort McRee		Lieut. Col. J. Erving, 2d artillery.	..	Headquarters 2d artillery.
Barrancas Barracks...		Capt. and Bvt. Maj. F. Woodbridge, 2d artillery.	1	2d artillery.....
Baton Rouge Barracks.	Baton Rouge, La.....	Capt. W. F. Barry, 2d artillery.	1	2d artillery.....
.....	.....	Companies not recruited.....	2	2d infantry.....
Aggregate of	the department	.....	29	.....

ADJUTANT GENERAL'S OFFICE, *Washington, November* 21, 1854.

East, commanded by Brevet Brigadier General James Bankhead, quarters, Baltimore, Md.—1854.

PRESENT.																																	ABSENT.										PRESENT AND ABSENT.		
Brigadier generals.	Assistant adjutants general (majors by brevet.)	Assistant adjutants general (captains by brevet.)	Assistant quartermasters general.	Deputy quartermasters general.	Quartermasters.	Assistant quartermasters.	Commissaries of subsistence (majors.)	Commissaries of subsistence (captains.)	Surgeons.	Assistant surgeons.	Deputy paymasters general.	Paymasters.	Colonels.	Lieutenant colonels.	Majors.	Captains.	Aids-de-camp.	Adjutants.	Regimental quartermasters.	First lieutenants.	Second lieutenants.	Brevet second lieutenants.	Military storekeepers.	Enlisted men.	Total commissioned.	Aggregate.	General staff officers.	Field officers.	Captains.	Subalterns.	Enlisted men.	Total commissioned.	Aggregate.	Commissioned officers.	Enlisted men.	Aggregate.
..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	2	2	..	..	..	..	..	....	..	....	2	....	2
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	1	..	..	40	3	43	..	..	..	1	2	1	3	4	42	46
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	45	2	47	..	..	..	2	....	2	2	4	45	49
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	1	..	..	59	3	62	..	..	..	1	....	1	1	4	59	63
..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	2	..	..	..	2	2	..	..	97	7	104	..	..	..	2	1	2	3	9	98	107
..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	2	..	..	..	1	1	2	..	..	142	8	150	..	..	..	2	1	2	3	10	143	153
..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	2	..	1	1	2	3	1	..	164	12	176	..	..	..	..	....	..	....	12	164	176
..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	2	2	4	..	..	..	..	....	..	....	2	2	4
..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	2	..	..	..	4	2	..	..	155	10	165	..	..	..	..	3	..	3	10	158	168
..	..	..	..	..	..	1	..	..	1	..	..	..	1	..	..	4	..	..	1	4	4	..	..	199	16	215	..	..	..	4	1	4	5	20	200	220
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	1	..	..	1	2	..	..	..	95	6	101	1	..	1	3	....	5	5	11	95	106
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	1	..	..	17	4	21	..	..	..	1	....	1	1	5	17	22
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	1	..	..	..	15	3	18	..	..	..	2	....	2	2	5	15	20
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2	..	..	..	3	1	1	..	134	8	142	..	..	1	5	15	6	21	14	149	163
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	3	2	1	..	118	8	126	..	..	2	4	21	6	27	14	139	153
..	..	..	..	..	..	1	..	1	..	1	..	..	..	..	1	..	..	..	..	1	..	..	..	31	5	36	..	..	..	..	....	..	....	5	31	36
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	....	1	..	..	..	..	....	..	....	....	1	1
..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	1	..	..	..	2	3	5	..	..	..	..	....	..	....	3	2	5
..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	1	1	..	..	31	4	35	..	..	..	..	....	..	....	4	31	35
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	1	..	..	..	17	3	20	..	..	..	2	....	2	2	5	17	22
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	1	2	1	..	16	6	22	..	..	..	..	....	..	....	6	16	22
..	1	..	..	..	..	2	..	1	4	9	..	..	4	2	3	25	..	3	5	29	23	4	..	1381	115	1496	1	..	4	29	44	34	78	149	1425	1574

E. COOPER, *Adjutant General.*

C.—*Position and distribution of the troops in the Department of the Twiggs—Headquarters,*

POSTS.	SITUATION.	COMMANDING OFFICERS.	GARRISONS.	
			Number of companies.	Regiments.
				Department staff.....
Fort Ripley.....	Upper Mississippi, Minnesota.	Capt. and Bvt. Maj. G. W. Patten, 2d infantry.	1	2d infantry.....
Fort Ridgely.....	Minnesota river, 90 miles from Fort Snelling.	Major H. Day, 2d infantry.....	3	2d infantry .....
Fort Snelling.....	Near St. Paul, Minnesota.	Capt. and Bvt. Maj. J. W. Sherman, 3d artillery.	1	3d artillery.....
Fort Laramie.....	Oregon route, Nebraska..	Maj. W. Hoffman, 6th infantry.	3	6th infantry.....
Fort Kearny.....	Oregon route, Nebraska..	First Lieut. Henry Heth, 6th infantry.	1	6th infantry.....
Fort Riley.....	Kansas river, Kansas	Maj. and Bvt. Lieut. Col. W. R. Montgomery, 2d infantry.	2	2d infantry.....
Fort Leavenworth....	Missouri river, Kansas...	Lieut. Col. P. St. G. Cooke. 2d dragoons.	5	2d dragoons and 4th artillery.
Jefferson Barracks....	Near St. Louis, Missouri.	Col. and Bvt. Brig. Gen. N. S. Clarke, 6th infantry.	6	6th infantry.....
Fort Gibson.....	Cherokee Nation, west of Arkansas.	Lieut. Col. P. Morrison, 7th infantry.	4	7th infantry.....
Fort Smith	Arkansas.....	Colonel H. Wilson, 7th infantry	..	Headquarters 7th infantry.
Fort Washita.....	False Washita, west of Arkansas.	Capt. and Bvt. Lt. Col. B. Bragg, 3d artillery.	2	2d and 3d artillery....
Fort Arbuckle.....	Wild Horse creek, west of Arkansas.	Major G. Andrews, 7th infantry	4	7th infantry .....
Aggregate of	the department	.....	32	.....

ADJUTANT GENERAL'S OFFICE, *Washington, November* 21, 1854.

West, commanded by Brigadier and Brevet Major General David E. St. Louis, Missouri—1854.

PRESENT.																																ABSENT.								PRESENT AND ABSENT.		
Brigadier generals.	Assistant adjutants general (majors by brevet.)	Assistant adjutants general (captains by brevet.)	Assistant quartermasters general.	Deputy quartermasters general.	Quartermasters.	Assistant quartermasters.	Commissaries of subsistence (majors.)	Commissaries of subsistence (captains.)	Surgeons.	Assistant surgeons.	Deputy paymasters general.	Paymasters.	Colonels.	Lieutenant colonels.	Majors.	Captains.	Aids-de-camp.	Adjutants.	Regimental quartermasters.	First lieutenants.	Second lieutenants.	Brevet second lieutenants.	Military storekeepers.	Enlisted men.	Total commissioned.	Aggregate.	General staff officers.	Field officers.	Captains.	Subalterns.	Enlisted men.	Total commissioned.	Aggregate.	Commissioned officers.	Enlisted men.	Aggregate.
1	1	1	..	..	1	..	..	1	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	....	7	7	..	..	..	..	....	..	....	7	....	7
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	1	1	..	..	76	4	80	..	..	..	1	....	1	1	5	76	81
..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	3	..	..	..	..	3	1	..	..	169	9	178	..	..	..	3	3	3	6	12	172	184
..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	2	1	..	..	..	85	5	90	..	..	..	..	....	..	....	5	85	90
..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	3	..	..	..	..	3	..	..	..	160	8	168	..	..	..	3	....	3	3	11	160	171
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	1	..	..	72	3	75	..	..	1	1	1	2	3	5	73	78
..	..	..	..	..	..	..	..	..	2	..	..	..	..	1	1	..	..	..	..	1	2	..	..	73	7	80	..	..	1	3	1	4	5	11	74	85
..	..	..	..	..	1	..	..	1	..	..	..	..	1	1	3	..	..	..	3	5	1	..	..	214	16	230	..	..	2	3	4	5	9	21	218	239
..	..	..	..	..	..	..	..	1	1	..	..	1	..	1	5	..	1	1	2	6	3	..	..	457	22	479	..	1	1	2	30	4	34	26	487	513
..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	3	..	..	1	1	2	1	.	..	84	10	94	..	..	1	5	28	6	34	16	112	128
..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	9	3	12	..	1	..	..	1	1	2	4	10	14
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2	..	..	..	4	2	..	..	94	9	103	..	..	..	..	2	..	2	9	96	105
..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	4	..	..	..	1	1	1	..	..	94	9	103	..	..	..	7	50	7	57	16	144	160
1	1	1	..	..	1	2	..	1	5	9	1	..	2	2	6	26	..	2	2	14	26	10	..	1587	112	1699	..	2	6	28	120	36	156	148	1707	1855

S. COOPER, *Adjutant General.*

D.—*Position and distribution of the troops in the Department of Texas, of mounted riflemen—Headquarters,*

POSTS.	SITUATION.	COMMANDING OFFICERS.	GARRISONS.	
			Number of companies.	Regiments.
				Department staff.....
Post on the Limpia....	Lower route to El Paso, Texas.	Lieut. Col. W. Seawell, 8th infantry.	6	8th infantry.....
Camp at Live Oak creek.	Midway between San Antonio and El Paso.	Capt. B. H. Arthur, 1st infantry	1	1st infantry.....
Camp on El Paso road	Near head of San Pedro..	Capt. R. S. Granger, 1st infantry	1	1st infantry..... ....
Fort Clark.....	Head of Las Moras river.	Capt. J. H. King, 1st infantry..	2	1st infantry.....
Fort Duncan.....	Eagle Pass, Texas	Col. J. Plympton, 1st infantry..	7	1st artillery and 1st infantry.
Fort McIntosh.....	Laredo, Texas.....	Lieut. Col. and Bvt. Col. W. W. Loring, rifles.	10	Rifles, 1st artillery, & 5th infantry.
Ringgold Barracks.....	Rio Grande City, Texas ..	Col. G. Loomis, 5th infantry...	8	Rifles, 4th artillery, & 5th infantry.
Fort Brown.....	Brownsville, Texas	Maj. G. Porter, 4th artillery....	3	4th artillery.....
Fort Merrill.....	Nueces river, 50 miles above Corpus Christi.	Capt. and Bvt. Lieut. Col. A. Porter, rifles.	2	Mounted rifles.....
Fort Inge.....	Near head of Leona river, Texas.	Maj. J. S. Simonson, rifles.....	2	Mounted rifles.....
Fort McKavett.....	San Saba river, Texas....	Captain W. J. Newton, 2d dragoons.	2	2d dragoons.....
Fort Chadbourne.....	Oak creek, 95 miles from Fort McKavett.	Capt. P. Calhoun, 2d dragoons.	2	2d dragoons.....
Fort Belknap.....	Red Fork, Brazos river, Texas.	Maj. E. Steen, 2d dragoons	3	2d dragoons and 7th infantry.
Escort to Mexican Boundary Commission.....		First Lieut. and Bvt. Capt. E. K. Smith, 7th infantry.	1	7th infantry and detachment of 1st infantry.
Aggregate of the department		.....	50	.....

ADJUTANT GENERAL'S OFFICE, *Washington, November* 21, 1854.

commanded by Bvt. Major General Persifor F. Smith, colonel regiment Corpus Christi, Texas—1854.

PRESENT.																																	ABSENT.							PRESENT AND ABSENT.		
Brigadier generals.	Assistant adjutants general (majors by brevet.)	Assistant adjutants general (captains by brevet.)	Assistant quartermasters general.	Deputy quartermasters general.	Quartermasters.	Assistant quartermasters.	Commissaries of subsistence (majors.)	Commissaries of subsistence (captains.)	Surgeons.	Assistant surgeons.	Deputy paymasters general.	Paymasters.	Colonels.	Lieutenant colonels.	Majors.	Captains.	Aids-de-camp.	Adjutants.	Regimental quartermasters.	First lieutenants.	Second lieutenants.	Brevet second lieutenants.	Military storekeepers.	Enlisted men.	Total commissioned.	Aggregate.	General staff officers.	Field officers.	Captains.	Subalterns.	Enlisted men.	Total commissioned.	Aggregate.	Commissioned officers.	Enlisted men.	Aggregate.
..	1	..	..	..	..	4	..	1	..	..	..	4	1	..	..	..	..	..	..	1	..	..	..	....	12	12	..	..	..	..	....	..	....	12	....	12
..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	4	..	1	1	3	2	..	..	220	12	232	..	2	2	7	15	11	26	23	235	258
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	1	1	..	..	71	4	75	..	..	..	1	3	1	4	5	74	79
..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	1	..	..	..	..	1	..	..	53	2	55	..	..	..	1	4	1	5	3	57	60
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2	..	..	..	1	1	1	..	110	7	117	..	1	..	3	4	4	8	11	114	125
..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	1	5	..	1	1	3	3	1	..	409	17	426	..	1	2	7	10	10	20	27	419	446
..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	7	..	1	..	3	6	3	..	579	22	601	..	1	3	13	14	17	31	39	593	632
..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	1	7	..	1	1	2	2	..	491	16	507	..	1	1	10	7	12	19	28	498	526
..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	2	..	..	..	6	1	..	125	11	136	..	..	1	2	1	3	4	14	126	140
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	1	1	..	111	4	115	..	..	1	2	2	3	5	7	113	120
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	2	..	..	..	1	2	..	73	7	80	..	..	..	2	2	2	4	9	75	84
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	2	1	..	58	5	63	..	..	1	2	26	3	29	8	84	92
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	1	1	1	3	..	..	99	8	107	..	..	1	2	9	3	12	11	108	119
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	1	..	..	..	2	.	1	..	111	6	117	..	..	2	5	30	7	37	13	141	154
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	30	2	32	..	..	1	1	5	2	7	4	35	39
..	1	..	..	..	5	..	1	1	10	..	4	3	2	5	35	..	5	4	28	25	6	..	2540	135	2675	..	6	15	58	132	79	211	214	2672	2886

S. COOPER, *Adjutant General.*

E.—*Position and distribution of the troops in the department of New 8th infantry—Headquarters, Santa*

POSTS.	SITUATION.	COMMANDING OFFICERS.	GARRISONS.	
			Number of companies.	Regiments.
				Department staff.....
Fort Massachusetts...	Utah country, 85 miles from Taos.	Capt. and Brevet Lieut. Col. H. Brooks, 2d artillery.	1	2d artillery. .....
Cantonment Burgwin.	Near Taos, New Mexico.	Major G. A. H. Blake, 1st dragoons.	1	1st dragoons.....
Fort Union	Moro river, New Mexico.	Colonel T. T. Fauntleroy, 1st dragoons.	2	1st dragoons, and 3d infantry.
Ordnance Depot, Fort Union.	Moro river, New Mexico.	Military Storekeeper W. R. Shoemaker.	..	Detachment ordnance
Fort Marcy.....	Santa Fé, New Mexico...	Capt. and Brevet Major W. T. H. Brooks, 3d infantry.	1	3d infantry.....
Albuquerque.....	New Mexico.....	Capt. and Brevet Lieut. Col. J. H. Eaton, 3d infantry.	2	1st dragoons, and 3d infantry.
Las Lunas.....	25 miles below Albuquerque.	Captain R. S. Ewell, 1st dragoons.	1	1st dragoons.....
Fort Defiance.....	Navajoe county, 190 miles west of Albuquerque.	Capt. and Brevet Major H L. Kendrick, 2d artillery.	3	2d artillery, and 3d infantry.
Fort Craig.....	Neat Valverde, New Mexico.	Capt. and Brevet Lieut. Col. D. J. Chandler, 3d infantry.	2	1st dragoons, and 3d infantry.
Fort Thorn.....	Santa Barbara, New Mexico.	Capt. and Brevet Major J. B. Richardson, 3d infantry.	2	1st dragoons, and 3d infantry.
Fort Fillmore.....	Brasito, 40 miles above El Paso.	Lieut. Col. D. S. Miles, 3d infantry.	4	1st dragoons, and 3d infantry.
Fort Bliss.....	Near El Paso, Texas.....	Major and Brevet Lieut. Col. E. B. Alexander, 8th infantry.	4	8th infantry.....
Aggregate of	the department	.....	23	.....

ADJUTANT GENERAL'S OFFICE, *Washington, November* 21, 1854.

Mexico, commanded by Brevet Brigadier General John Garland, colonel Fé, New Mexico—1854.

PRESENT.																															ABSENT.								PRESENT AND ABSENT.		
Brigadier generals.	Assist. adjutants general (majors by brevet.)	Assist. adjutants general (captains by brevet.)	Assistant quartermasters general.	Deputy quartermasters general.	Quartermasters.	Assistant quartermasters.	Commissaries of subsistence (majors.)	Commissaries or subsistence (captains.)	Surgeons.	Assistant surgeons.	Deputy paymasters general.	Paymasters.	Colonels.	Lieutenant colonels.	Majors.	Captains.	Aids-de-camp	Adjutants.	Regimental quartermasters.	First lieutenants.	Second lieutenants.	Brevet second lieutenants.	Military storekeepers.	Enlisted men.	Total commissioned.	Aggregate.	General staff officers.	Field officers.	Captains.	Subalterns.	Enlistsd men.	Total commissioned.	Aggregate.	Commissioned officers.	Enlisted men.	Aggregate.
..	..	1	..	..	..	..	2	..	1	1	..	..	2	1	..	..	..	..	..	..	1	..	..	..	....	9	9	..	..	..	..	....	..	....	9	....	9
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	1	..	..	..	92	3	95	..	..	..	2	1	2	3	5	93	98
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	1	..	..	80	3	83	..	..	..	1	3	1	4	4	83	87
..	..	..	..	..	..	1	..	..	1	..	..	..	1	..	..	2	..	..	1	2	2	..	..	112	10	122	..	..	..	1	8	1	9	11	120	131
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	10	1	11	..	..	..	..	....	..	....	1	10	11
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	1	1	..	65	4	69	..	..	..	1	2	1	3	5	67	72
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	1	3	..	..	131	6	137	..	..	..	3	17	3	20	9	148	157
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	67	2	69	..	..	..	1	19	1	20	3	86	89
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	3	..	..	..	2	2	..	..	174	8	182	..	..	..	2	39	2	41	10	213	223
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	2	1	..	..	126	5	131	..	..	1	2	15	3	18	8	141	149
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	1	1	1	..	148	5	153	..	..	1	2	7	3	10	8	155	163
..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	3	..	1	1	2	2	1	..	227	12	239	..	3	1	2	34	6	40	18	261	279
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	3	..	..	..	2	4	1	..	154	12	166	..	..	1	2	17	3	20	15	171	186
....	1	..	..	..	..	3	..	1	1	8	..	2	2	1	2	19	..	1	2	14	18	4	1	1386	80	1466	..	3	4	19	162	26	188	106	1548	1654

S. COOPER, *Adjutant General.*

F.—*Position and distribution of the troops in the Department of the Wool—Headquarters,*

POSTS.	SITUATION.	COMMANDING OFFICERS.	GARRISONS. Number of companies.	GARRISONS. Regiments.
				Department staff.....
Steilacoom	Puget's Sound, Washington Territory.	Capt. D. A. Russell, 4th infantry	2	4th infantry .....
Fort Vancouver.....	Vancouver, Washington Territory.	Lieut. Col. B. L. E. Bonneville, 4th infantry.	2	4th infantry .....
Fort Dalles.....	Dalles of Columbia, Oregon.	Major G. J. Rains, 4th infantry.	3	3d artillery and 4th infantry.
Fort Lane.....	8 miles from Jacksonville, Oregon.	Capt. A. J. Smith, 1st dragoons.	2	1st dragoons .....
Fort Orford.....	Port Orford, Oregon	Second Lieut. A. V. Kantz, 4th infantry.	..	Detachment.....
Fort Jones.....	Yreka, California.....	Capt. H. M. Judah, 4th infantry	1	4th infantry .....
Fort Humboldt	Humboldt bay, California.	Capt. and Bvt. Lieut. Col. R. C. Buchanan, 4th infantry.	2	4th infantry .....
Fort Reading	Cow creek, Upper Sacramento, California.	Maj. and Bvt. Col. G. Wright, 4th infantry.	2	3d artillery and 4th infantry.
Benicia Barracks.....	Benicia, California.....	Major and Brevet Lieut. Col. G. Nauman, 3d artillery.	1	3d artillery.....
Benicia Arsenal	Benicia, California.....	First Lieut. and Bvt. Capt. C. P. Stone, ordnance.	..	Ordnance detachment
Presidio San Francisco	Near San Francisco, California.	Capt. E. D. Keyes, 3d artillery.	1	3d artillery.....
Fort Miller.....	San Joaquin river, California.	First Lieut. L. Loeser, 3d artillery.	1	3d artillery.....
Fort Tejon	Near Tejon pass, California.	Maj. and Bvt. Lieut. Col. B. L. Beall, 1st dragoons.	1	1st dragoons .....
Fort Yuma.....	Mouth of Gila, California.	Capt. and Bvt. Maj. G. H. Thomas, 3d artillery.	2	1st and 3d artillery...
Mission San Diego....	Near San Diego, California	Capt. H. S. Burton, 3d artillery.	2	3d artillery..... .. ..
En route to department	Great Salt Lake City, Utah	Capt. and Bvt. Lieut. Col. E. J. Steptoe, 3d artillery.	2	3d artillery.....
Aggregate of	the department	.....	24	.....

ADJUTANT GENERAL'S OFFICE, *Washington, November* 21, 1854.

Pacific, commanded by Brigadier and Brevet Major General John E. Wool.
Benicia, California—1854.

PRESENT.																																	ABSENT.								PRESENT AND ABSENT.		
Brigadier generals.	Assistant adjutants general (majors by brevet.)	Assistant adjutants general (captains by brevet.)	Assistant quartermasters general.	Deputy quartermasters general.	Quartermasters.	Assistant quartermasters.	Commissaries of subsistence (majors.)	Commissaries of subsistence (captains.)	Surgeons.	Assistant surgeons.	Deputy paymasters general.	Paymasters.	Colonels.	Lieutenant colonel.	Majors.	Captains.	Aids-de-camp.	Adjutants.	Regimental quartermasters.	First lieutenants.	Second lieutenants.	Brevet second lieutenants.	Military storekeepers.	Enlisted men.	Total commissioned.	Aggregate.	General staff officers.	Field officers.	Captains.	Subalterns.	Enlisted men.	Total commissioned.	Aggregate.	Commissioned officers.	Enlisted men.	Aggregate.
1	1	1	..	..	1	2	..	1	1	..	1	..	..	..	..	..	1	..	..	1	..	1	..	1	12	13	..	..	..	..	....	..	....	12	1	13
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	1	2	1	..	47	6	53	..	..	2	..	8	2	10	8	55	63
..	..	..	..	..	..	1	..	..	1	..	..	..	..	1	..	2	..	1	1	..	1	1	..	79	9	88	..	1	2	3	4	4	8	13	83	96
..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	1	2	..	..	..	1	1	..	..	68	7	75	..	..	1	1	....	2	2	9	68	77
..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	2	..	..	..	1	1	..	..	62	5	67	..	..	..	2	1	2	3	7	63	70
..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	21	2	23	..	..	..	..	....	..	....	2	21	23
..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	1	1	1	..	25	5	30	..	..	..	..	1	..	1	5	26	31
..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	2	..	..	..	1	2	..	..	61	6	67	..	..	..	2	....	2	2	8	61	69
..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	1	..	..	1	1	1	..	..	74	5	79	..	..	2	5	2	7	9	12	76	88
..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	1	1	1	1	..	71	6	77	..	..	1	1	1	2	3	8	72	80
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	40	1	41	..	..	..	1	7	1	8	2	47	49
..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	1	..	..	..	..	1	..	..	53	4	57	..	..	..	4	27	4	31	8	80	88
..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	2	..	..	..	69	4	73	..	..	1	5	4	2	6	6	73	79
..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	1	..	1	..	49	4	53	..	..	1	1	4	2	6	6	53	59
..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	2	1	..	..	100	5	105	..	..	2	2	48	4	52	9	148	157
..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	1	..	..	..	132	3	135	..	..	1	5	8	6	14	9	140	149
..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	1	3	..	..	156	6	162	..	..	1	4	7	5	12	11	163	174
1	1	1	....	..	1	7	..	1	3	13	1	..	..	1	4	14	1	2	2	16	16	5	..	1108	90	1198	..	1	12	32	122	45	167	135	1230	1365

S. COOPER, *Adjutant General.*

G.—*General return of the army of the United States, compiled from the latest*

	PRESENT.																					
	For duty.																					
	Major general.	Brigadier generals.	Adjutant general.	Assistant adjutant general (lieutenant colonel.)	*Assistant adjutants general (majors by brevet.)	*Assistant adjutants general (captains by brevet.)	*Judge advocate.	Inspectors general.	Quartermaster general.	Assistant quartermasters general.	Deputy quartermasters general.	Quartermasters.	*Assistant quartermasters.	Commissary general of subsistence.	Assistant commissary general of subsistence.	Commissaries of subsistence (majors.)	*Commissaries of subsistence (capt's.)	Surgeon general.	Surgeons.	Assistant surgeons.
General officers	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Aids-de-camp to general officers	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Adjutant general's department	..	..	1	1	4	8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Judge advocate's department	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Inspector general's department	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..
Quartermaster's department	..	..	..	..	..	..	..	..	1	1	2	5	25	..	..	..	..	..	..	..	..
Subsistence department	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	1	6	..	..	..	..
Medical department	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	20	68	
Pay department	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Corps of engineers	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Corps of topographical engineers	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ordnance department	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1st regiment of dragoons	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2d regiment of dragoons	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Aggregate of dragoons	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Regiment of mounted riflemen	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1st regiment of artillery	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2d regiment of artillery	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3d regiment of artillery	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4th regiment of artillery	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Aggregate of artillery	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1st regiment of infantry	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2d regiment of infantry	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3d regiment of infantry	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4th regiment of infantry	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5th regiment of infantry	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6th regiment of infantry	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7th regiment of infantry	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8th regiment of infantry	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Aggregate of infantry	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Non-commissioned staff unattached to regiments	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Military Academy detachments	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Principal recruiting depot, Fort Columbus, N. Y.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cavalry recruiting depot, Jefferson barracks, Mo.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Recruiting depot, Newport barracks, Ky.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Recruits at rendezvous and in route	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Aggregate of detachments, and at depots, rendezvous, &c.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Grand aggregate	1	2	1	1	4	8	1	2	1	1	2	5	25	1	1	1	6	1	20	68	

* *Two* of the assistant adjutants general, (majors by brevet,) *two* of the assistant adjutants general, (captains by brevet,) *four* of the assistant quartermasters, and *three* of the commissaries of subsistence, (captains,) belonging also to regiments, and being reported in the strength thereof, to avoid counting them *twice*, are excluded as *staff officers* from the columns "total commissioned" and "aggregate" of their respective departments. The regimental and staff commissions held by these officers are of *unequal* grades, and hence they are not affected by the provisions of the 7th section of the act of June 18, 1846. The like remark is applicable to the *judge advocate* of the army, who is also a captain in the ordnance department.

returns, (of different dates,) corrected at the Adjutant General's office, 1854.

PRESENT.

For duty.

Paymaster general.	Deputy paymasters general.	Paymasters.	Colonels.	Lieutenant colonels.	Majors.	Captains.	* Aids-de-camp.	† Adjutants.	† Regimental quartermasters.	First lieutenants.	Second lieutenants.	Brevet second lieutenants.	Military storekeepers.	Sergeant majors.	Quartermaster sergeants.	Principal or chief musicians.	Chief buglers.	Ordnance sergeants.	Sergeants.	Corporals.	Buglers.	Musicians.	Farriers and blacksmiths.	Artificers.	Enlisted men of ordnance.	Privates.
..	..	....	....	....	....	....	3	....	....	....	....	....	....	....	....	....	....	....	....	....	..	....	..	..	....	.....
..	..	....	....	....	....	....	..	....	....	....	....	....	....	....	....	....	....	....	....	....	..	....	..	..	....	.....
..	..	....	....	....	....	....	..	....	....	....	....	....	....	....	....	....	....	....	....	....	..	....	..	..	....	.....
..	..	....	....	....	....	....	..	....	....	....	....	....	....	....	....	....	....	....	....	....	..	....	..	..	....	.....
..	..	....	....	....	....	....	..	....	....	....	....	....	....	....	....	....	....	....	....	....	..	....	..	..	....	.....
..	..	....	....	....	....	....	..	....	....	....	....	....	2	....	....	....	....	....	....	....	..	....	..	..	....	.....
..	..	....	....	....	....	....	..	....	....	....	....	....	....	....	....	....	....	....	....	....	..	....	..	..	....	.....
1	2	21	....	....	....	....	..	....	....	....	....	....	....	....	....	....	....	....	....	....	..	....	..	..	....	.....
..	..	....	1	2	4	11	..	....	....	8	7	4	....	....	....	....	....	....	6	1	..	1	..	18	....	26
..	..	....	1	1	4	9	..	....	....	5	2	2	....	....	....	....	....	....	....	....	..	....	..	..	....	.....
..	..	....	1	1	3	13	..	....	....	12	3	3	14	....	....	..	..	..	....	....	..	....	..	..	295	.....
..	..	....	1	....	2	7	..	1	1	7	5	2	....	1	....	1	1	..	27	24	12	....	5	..	....	485
..	..	....	....	1	2	5	..	1	1	6	8	4	....	....	1	..	1	..	28	25	13	....	3	..	....	195
..	..	....	1	1	4	12	..	2	2	13	13	6	....	1	1	1	2	..	55	49	25	....	8	..	....	680
..	..	....	....	1	1	7	..	1	....	5	7	....	....	....	....	..	2	..	17	10	5	....	10	..	....	108
..	..	....	1	1	1	9	..	....	1	12	8	....	....	1	1	..	..	..	33	26	2	13	..	12	....	362
..	..	....	....	1	2	10	..	1	1	17	10	2	....	1	1	..	..	..	25	32	2	13	..	14	....	407
..	..	....	....	....	1	6	..	1	1	14	10	3	....	1	1	..	..	..	32	21	3	15	..	13	....	423
..	..	.. ..	1	....	2	9	..	1	1	11	10	....	....	1	1	1	..	..	32	29	3	14	..	14	....	310
..	..	....	2	2	6	34	..	3	4	54	38	5	....	4	4	1	1	..	122	108	10	55	..	53	....	1,502
..	..	....	1	....	1	8	..	1	....	2	5	2	....	1	1	..	..	..	21	14	..	8	..	..	....	414
..	..	....	1	....	2	10	..	1	1	3	8	5	....	....	1	2	..	..	23	19	..	10	..	..	....	289
..	..	....	....	1	....	9	..	1	1	5	8	3	....	1	1	2	..	..	23	28	..	14	..	..	....	274
..	..	....	....	1	2	8	..	1	1	5	10	4	....	1	1	2	..	..	25	21	..	7	..	..	....	116
..	..	....	1	1	1	8	..	1	1	3	8	3	....	1	....	1	..	..	9	8	..	10	..	..	....	54
..	..	....	1	....	2	7	..	1	1	3	10	3	....	1	1	2	..	..	26	18	..	13	..	..	....	378
..	..	....	1	1	1	7	..	1	1	2	9	4	....	1	1	2	..	..	19	13	..	10	..	..	....	75
..	..	....	....	1	1	7	..	1	1	4	7	2	....	1	1	..	..	..	25	24	..	14	..	..	....	182
..	..	....	5	5	10	64	..	8	7	27	65	26	....	7	7	11	..	..	171	145	..	86	..	..	....	1,782
..	..	....	....	....	....	....	..	....	....	....	....	....	....	....	....	....	..	72	...	....	..	....	..	..	....	.....
..	..	....	....	....	....	....	..	....	....	....	....	....	....	....	....	1	..	..	5	6	1	37	..	2	....	99
..	..	....	....	....	....	....	..	....	....	....	....	....	....	....	....	....	..	..	4	9	..	20	..	..	....	444
..	..	....	....	....	....	....	..	....	....	....	....	....	....	....	....	....	..	..	6	2	2	....	..	..	....	121
..	..	....	....	....	....	....	..	....	....	....	....	....	....	....	....	....	..	..	4	4	..	2	..	..	....	109
..	..	....	....	....	....	....	..	....	....	....	....	....	....	....	....	....	..	..	19	6	..	1	..	..	....	121
..	..	....	....	....	....	....	..	....	....	....	....	....	....	....	....	1	..	..	38	27	3	60	..	2	....	894
1	2	21	11	13	32	150	3	14	13	124	135	46	16	12	12	14	4	72	409	340	43	202	18	73	295	4,992

* The aids-de-camp being taken from regiments, and reported in the strength thereof, to avoid counting the *twice*, are excluded as *staff officers* from the columns "total commissions" and "aggregate."

† The adjutants of artillery and infantry, (12,) and *all* the regimental quartermasters, (15,) being taken from the subalterns, and accounted for in their several regiments as belonging to companies, are excluded as regimental *staff* officers from the columns "total commissioned" and "aggregate."

G.—*General return of the army*

	PRESENT.																
	On extra or daily duty.					Sick.					In arrest or confinement.						
	General staff officers.	Field officers.	Captains.	Subalterns.	Enlisted men.	General staff officers.	Field officers.	Captains.	Subalterns.	Enlisted men.	General staff officers.	Field officers.	Captains.	Subalterns.	Enlisted men.	Total commissioned.	Total enlisted.
General officers	..	..	..	..	....	..	..	..	..	....	....	....	....	..	..	3	.....
Aids-de-camp to general officers	..	..	..	..	....	..	..	..	..	....	....	....	....	..	....	....	.....
Adjutant general's department	..	..	..	..	....	..	..	..	..	....	....	....	....	..	....	10	.....
Judge advocate's department	..	..	..	..	....	..	..	..	..	....	....	....	....	..	....	....	.....
Inspector general's department	..	..	..	..	....	..	..	..	..	....	....	....	....	..	....	2	.....
Quartermaster's department	..	..	..	..	....	..	..	..	..	....	....	....	....	..	....	32	.....
Subsistence department	..	..	..	..	....	..	..	..	..	....	....	....	....	..	....	6	.....
Medical department	..	..	..	..	....	..	..	..	..	....	....	....	....	..	....	89	.....
Pay department	..	..	..	..	....	..	..	..	..	....	....	....	....	..	....	24	.....
Corps of engineers	..	..	..	..	1	..	..	..	..	2	....	....	....	..	3	37	58
Corps of topographical engineers	..	..	..	..	....	..	..	..	..	....	....	....	....	..	....	24	.....
Ordnance department	..	..	..	..	....	..	..	..	..	....	....	....	....	..	....	50	295
1st regiment of dragoons	..	..	..	..	137	..	..	..	..	56	....	....	....	..	21	26	770
2d regiment of dragoons	..	..	..	..	89	..	..	..	..	38	....	....	....	..	21	28	414
Aggregate of dragoons	..	..	..	..	226	..	..	..	..	94	....	....	....	..	42	54	1,184
Regiment of mounted riflemen	..	..	..	..	255	..	..	..	..	54	....	....	....	..	15	22	476
1st regiment of artillery	..	..	..	..	65	..	..	..	1	41	....	....	....	..	19	34	575
2d regiment of artillery	..	..	..	..	74	..	..	..	..	28	....	....	....	..	25	44	622
3d regiment of artillery	..	..	..	1	127	..	..	..	..	44	....	....	....	..	20	37	709
4th regiment of artillery	..	..	..	..	63	..	..	1	2	40	....	....	....	..	41	38	549
Aggregate of artillery	..	..	..	1	329	..	..	1	3	153	....	....	....	..	105	153	2,446
1st regiment of infantry	..	..	..	..	31	..	..	..	..	14	....	....	....	..	1	20	505
2d regiment of infantry	..	..	..	..	81	..	..	..	1	15	....	....	....	..	25	32	465
3d regiment of infantry	..	..	..	..	181	..	..	..	..	32	....	....	....	..	12	28	568
4th regiment of infantry	..	..	..	1	91	..	..	..	..	22	....	....	....	..	12	33	298
5th regiment of infantry	..	..	..	..	283	..	..	..	..	20	....	....	....	..	14	27	400
6th regiment of infantry	..	..	..	..	107	..	..	..	..	36	....	....	....	..	41	28	623
7th regiment of infantry	..	..	..	..	131	..	..	..	..	17	....	....	....	..	6	27	275
8th regiment of infantry	..	..	..	..	70	..	..	..	..	14	....	....	....	..	20	24	351
Aggregate of infantry	..	..	..	1	975	..	..	..	1	170	....	....	....	..	131	219	3,485
Non-commissioned staff unattached to regiments	..	..	..	..	....	..	..	..	..	....	....	....	....	..	....	....	72
Military Academy detachments	..	..	..	..	3	..	..	..	..	5	....	....	....	..	....	....	158
Principal recruiting depot, Fort Columbus, N. Y.	..	..	..	..	79	..	..	..	..	8	....	....	....	..	13	....	578
Cavalry recruiting depot, Jefferson barracks, Mo.	..	..	..	..	10	..	..	..	..	14	....	....	....	..	4	....	159
Recruiting depot, Newport barracks, Ky.	..	..	..	..	7	..	..	..	..	11	....	....	....	..	15	....	152
Recruits at rendezvous and in route	..	..	..	..	....	..	..	..	..	2	....	....	....	..	2	....	151
Aggregate of detachments, and at depots, rendezvous, &c.	..	..	..	..	99	..	..	..	..	40	....	....	....	..	34	....	1,198
Grand aggregate	..	..	..	2	1885	..	..	1	4	513	....	....	....	..	330	725	9,214

* The " number of recruits required" is calculated for each regiment according to the stations of the several companies at the present date—the number of *privates* varying according to station, as explained in note (‡‡) to table A, showing the legal organization of the army.

† The number of enlisted men necessary to complete the military establishment is obtained by deducting from the whole number of recruits required to fill up all the regiments, the several detachments at the Military Academy, the three depots, (Fort Columbus, Newport barracks, and Jefferson barracks,) and the recruits at

of the United States—Continued.

ABSENT.														PRESENT AND ABSENT.			
On detached service.					With leave or on furlough.		Without leave.		Sick.		In arrest or confinement.						
General staff officers.	Field officers.	Captains.	Subalterns.	Enlisted men.	Commissioned officers.	Enlisted men.	Commissioned officers.	Enlisted men.	Commissioned officers.	Enlisted men.	Commissioned officers.	Enlisted men.	Total commissioned.	Total enlisted.	Commissioned officers.	Enlisted men.	Aggregate.	* Number of recruits required.
....	....	....	....	.....	.....	.....	....	....	....	....	.....	.....	....	....	3	.....	3	.....
....	....	....	....	.....	.....	.....	....	....	....	....	.....	.....	....	....	.....	.....	.....	.....
....	....	....	....	.....	.....	.....	....	....	....	....	.....	.....	....	....	10	.....	10	.....
....	....	....	....	.....	.....	.....	....	....	....	....	.....	.....	....	....	.....	.....	.....	.....
....	....	....	....	.....	.....	.....	....	....	....	....	.....	.....	....	....	2	.....	2	.....
....	1	2	....	.....	1	.....	....	....	....	....	.....	.....	4	....	36	.....	36	.....
....	1	1	....	.....	1	.....	....	....	....	....	.....	.....	3	....	9	.....	9	.....
1	....	....	....	.....	1	.....	1	....	2	....	1	.....	6	....	95	.....	95	.....
....	....	....	....	.....	2	.....	....	....	2	....	.....	.....	4	....	28	.....	28	.....
....	....	3	7	6	.....	.....	....	....	....	....	.....	.....	10	6	47	64	111	36
....	....	5	12	.....	.....	.....	....	....	....	....	.....	.....	17	....	41	.....	41	.....
....	....	1	1	12	1	2	....	....	....	1	.....	.....	4	15	54	310	364	.....
....	1	1	6	11	.....	4	....	....	4	15	.....	4	12	34	38	804	842	51
....	....	3	3	9	2	9	....	....	3	1	.....	3	11	22	39	436	475	419
....	1	4	9	20	2	13	....	....	7	16	.....	7	23	56	77	1,240	1,317	470
....	1	2	10	.....	1	2	....	....	1	1	.....	7	15	10	37	486	523	379
....	....	1	13	27	3	5	....	....	1	8	.....	1	18	41	52	616	668	248
....	1	2	6	47	.....	7	....	....	1	....	.....	1	10	55	54	677	731	273
....	....	2	8	26	3	4	....	....	5	16	.....	4	18	50	55	750	805	274
....	1	2	10	63	1	3	....	....	....	....	.....	3	14	69	52	618	670	182
....	2	7	37	163	7	19	....	....	7	24	.....	9	60	215	213	2,661	2,874	977
....	....	1	13	44	3	4	....	....	1	9	.....	2	18	59	38	564	602	280
....	1	....	5	1	1	.....	....	....	....	3	.....	.....	7	4	39	469	508	375
....	1	....	4	16	3	4	....	....	2	4	.....	6	10	30	38	598	636	246
....	....	2	2	4	1	5	....	....	....	1	.....	6	5	16	38	314	352	530
....	....	1	5	.....	2	7	....	....	3	4	.....	2	11	13	38	413	451	431
....	....	1	5	29	3	7	....	....	....	3	.....	4	9	43	37	666	703	178
....	....	1	8	34	2	4	....	....	1	5	.....	.....	12	43	39	318	357	398
....	2	1	5	22	2	14	....	....	3	10	.....	6	13	52	37	403	440	441
....	4	7	47	150	17	45	....	....	10	39	.....	26	85	260	304	3,745	4,049	2,879
....	....	....	....	.....	.....	.....	....	....	....	....	.....	.....	....	....	.....	72	72	.....
....	....	....	....	.....	.....	.....	....	....	....	....	.....	.....	....	....	.....	158	158	.....
....	....	....	....	4	.....	2	....	....	....	....	.....	.....	....	6	.....	584	584	.....
....	....	....	....	.....	.....	.....	....	....	....	....	.....	2	....	2	.....	161	161	.....
....	....	....	....	4	.....	.....	....	....	....	....	.....	1	....	5	.....	157	157	.....
....	....	....	....	.....	.....	.....	....	....	....	....	.....	.....	....	....	.....	151	151	.....
....	....	....	....	8	.....	2	....	....	....	....	.....	3	....	13	.....	1,211	1,211	4,741 1,211
1	10	32	123	359	33	83	1	....	29	81	1	52	231	675	956	9,789	10,745	†3,530

rendezvous and in route. The number required for regiments and corps is 4,741; the number at the Military Academy, at depots, and in route, is 2,211; leaving 3,530 as the number of recruits yet required to fill up the establishment.

S. COOPER, *Adjutant General.*

ADJUTANT GENERAL'S OFFICE, *Washington, November* 21, 1854.

H.

ADJUTANT GENERAL'S OFFICE,
Washington, November 21, 1854.

Statement showing the whole number of recruits enlisted in the army from the 1st of October, 1853, to the 30th of September, 1854.

I.—GENERAL RECRUITING SERVICE.

Lieut. Col. J. J. Abercrombie, 2d Infantry, General Superintendent.

Eastport, Me	18	
Boston, Mass	221	
New York, N. Y	951	
Albany, "	33	
Oswego, "	2	
Utica, "	19	
Rochester, "	75	
Buffalo, "	131	
Whitehall, "	5	
Philadelphia, Pa	193	
Lancaster, "	32	
Pittsburg, "	51	
Harrisburg, "	111	
Pottsville, "	3	
Easton, "	29	
Baltimore, Md	64	
Cumberland, Md	9	
Newport, Ky	166	
Maysville, Ky	3	
Cleveland, Ohio	18	
Dayton, Ohio	7	
St. Louis, Mo	134	
Chicago, Ill	87	
Detroit, Mich	1	
Warrington, Fla	1	
Fort Ripley, Min	1	
Number of recruits enlisted for the general service		2,365

II.—MOUNTED SERVICE.

New York, N. Y	467	
Philadelphia, Pa	22	
Baltimore, Md	109	
Cleveland, Ohio	29	
Jefferson Barracks, Mo	63	
St. Louis, Mo	30	
Nashville, Tenn	10	
Number of recruits enlisted for mounted service		730

III.—REGIMENTAL SERVICE.

1st regiment of dragoons	21	
2d regiment of dragoons	43	
Regiment of mounted riflemen	21	
Total mounted troops		85
1st regiment of artillery	92	
2d regiment of artillery	87	
3d regiment of artillery	33	
4th regiment of artillery	125	
Total artillery		337
1st regiment of infantry	11	
2d regiment of infantry	241	
3d regiment of infantry	27	
4th regiment of infantry	11	
5th regiment of infantry	40	
6th regiment of infantry	227	
7th regiment of infantry	23	
8th regiment of infantry	24	
Total infantry		604
Corps of sappers and miners		48
Detachment at West Point		52
Total number enlisted from October 1, 1853, to September 30, 1854		4,221

IV.—RECAPITULATION.

For the general service	2,365	
For mounted service	730	
By regiments—		
Dragoons and mounted riflemen	85	
Artillery	337	
Infantry	604	
Sappers and miners, and detachment	100	
		4,221

V.—Amount of recruiting funds in the hands of officers of the army September 30, 1853	$13,232 05
Amount of recruiting funds advanced to recruiting officers from October 1, 1853, to September 30, 1854	64,963 12
	78,195 07
Amount of funds accounted for from October 1, 1853, to September 30, 1854	59,723 66
Balance in the hands of recruiting officers September 30, 1854	18,471 51

The foregoing statement indicates an improvement in the recruiting service, as compared with the year preceding. This may be chiefly attributable to the increased compensation granted to enlisted men by the act of Congress approved August 4, 1854.

The officers engaged upon the recruiting service have exhibited a careful attention to their duties, and the recruits received into the service have been subjected to a rigid examination in every respect. During the year ending September 30, 1854, 14,439 persons have presented themselves at the several rendezvous for enlistment, of whom 4,221 were accepted as effective recruits, (being 1,358 more than the year preceding,) and 10,218 were refused. The principal causes of rejection are, appearance of intemperance, ignorance of the English language, physical and mental disqualification, and minority. The improvement which has taken place in the recruiting service has enabled the officers to make better selections of men; and, in consequence, the ranks of the army, since the passage of the act of Congress above referred to, have been materially benefited. From the 30th of September last to the 10th of November, 687 recruits were enlisted.

The number of officers engaged upon the general recruiting service is as follows: for the artillery and infantry, one lieutenant colonel, (superintendent,) one major, and sixteen subalterns; for the cavalry service, one lieutenant colonel, (superintendent,) and six subalterns. Captains are not, at present, detailed for the recruiting service. The officers who were on the general recruiting service at the date of my last report, except the superintendent, were relieved on the 31st of July, 1854, by a new detail to serve for two years.

The recruiting for the mounted service is now conducted under a separate superintendency, which was established at the depot of instruction at Jefferson barracks October 29, 1854.

Respectfully submitted:

S. COOPER,
Adjutant General

Hon. JEFFERSON DAVIS,
Secretary of War, Washington, D. C.

REPORT OF THE QUARTERMASTER GENERAL.

QUARTERMASTER GENERAL'S OFFICE,
Washington City, November 14, 1854.

SIR: In obedience to your order of the 4th instant, and in compliance with a provision of the regulations of the army, I have the honor to report the operations of the Quartermaster's department during the fiscal year commencing the 1st of July, 1853, and terminating the 30th of June, 1854.

At the date of my last annual report, the apparent balances in the hands of officers and agents of the department amounted, in the aggregate, to $648,757 41

To which are to be added:

1. Remittances during the fiscal year...	$4,266,972 91	
2. Sales of public property.....	97,498 15	
		4,364,471 06
Making the whole amount to be accounted for.....		5,013,228 47
From which are to be deducted:		
1. Expenditures for which accounts have been received, examined, and sent to the treasury.....	4,029,018 30	
2. Deposites to the credit of the Treasurer	29,272 66	
		4,058,290 96
Leaving to be accounted for.....		954,937 51

Of this sum, $8,550 73 is due by Captain Grant, late of the 4th regiment of infantry; $500 by Dr. William Hammond, late assistant surgeon in the army; and $1,449 44 by Captain S. L. Fremont, late quartermaster of the 3d artillery. As these gentlemen are out of service and no longer under the control of any military authority, but accountable to the treasury only, I consider it proper to deduct their indebtedness from the apparent balance, which will leave to be accounted for through this office $944,437 44.

By an examination of the accounts of Captain J. L. Folsom and Brevet Captain J. H. Lendrum, for whose relief acts were passed at the last session of Congress, the indebtedness of the former appears to be..... $207,087 83

And of the latter..... 6,205 60

Making..... 213,293 43

These officers, it is understood, will avail themselves without delay of the acts passed in their favor, and will thus reduce the apparent

balance unaccounted for the amount of their joint indebtedness, and leave a positive balance of $731,143 91.

Nineteen officers and agents of the department, whose joint accountability amounts to $89,027 09, have failed to render the accounts due from them at the close of the fiscal year, or to include in the accounts rendered the entire amounts for which they were then accountable. One of them (Lieutenant A. D. Tree, of 2d dragoons) has been repeatedly reported. He is accountable for $20,782 45. It is understood that he has made disbursements, but as he renders no accounts I am compelled to report him every quarter. Another (Lieutenant W. T. Mechling) is accountable for $6,029 20. He is said to have made disbursements, but has rendered no accounts. I recommend that prompt measures be adopted to compel both to send on their vouchers, if they have any, or to pay into the treasury the amounts respectively due.

Another, Lieutenant Loeser, is accountable for $565 09, but it is understood that he and Lieutenant Fremont, mentioned above, lost the public money in their hands, as well as all their vouchers, in the wreck of the San Francisco; and an act of Congress will probably be necessary to settle their accounts.

Four of these officers who have ceased to disburse are accountable, severally, for the following sums, viz:

Lieutenant T. Moore, $1,707 78; Lieutenant L. Long, $24; Lieutenant A. Merchant, $553 63; and Lieutenant M. R. Stevenson, $3,172 74.

These gentlemen have been called on to pay over the sums in their hands to the quartermasters at or nearest to the stations at which they are now respectively serving. The officers whose accounts have not been received are, it is understood, either in Oregon, California, New Mexico, or the Indian country west, or en route to California and Oregon, and their accounts are probably now in the mail and on the way to Washington.

The remainder of the sum unaccounted for is distributed among one hundred and sixty-nine disbursing officers, and is applicable to the payment of the outstanding claims against the department at the close of the fiscal year, and to the service of the present year.

The supplies due from the department have been promptly furnished to those entitled to receive them. They consisted of fuel for officers and men, costing, so far as accounts have been received, $112,070 69

Forage for an average of 8,663 public animals employed during the year, including the horses of the mounted corps, and for express service, and horses, mules, and oxen employed in the transportation of troops and supplies, and costing in the aggregate..... 741,001 98

Straw for soldiers' bedding, costing..... 3,688 74

And stationery for the public service throughout the Union, costing..... 17,350 34

Also office furniture for commanding and staff officers throughout our territories, costing..... 2,785 09

Medicines for horses and mules, costing..... 4,390 37

Travelling forges, blacksmith and shoeing tools, horse-shoes, nails, iron and steel, costing..... $22,401 72
And clothing and dragoon equipments, camp and garrison equipage, and small supplies for the mounted service, amounting in the aggregate to..... 336,664 29

Transportation has been furnished for all the supplies required for the army, for the troops operating in the field, for more than two thousand recruits from the recruiting depots to the regiments and companies to which they were assigned, for troops required to change their stations, in some instances from one extreme of the continent to the other, for escorts to surveying parties across the continent, and public animals and other property sent to New Mexico and California. The cost of the whole, so far as accounts have reached the office, amounts to $1,839,376 11. Of this sum one hundred and twenty-nine thousand nine hundred dollars was paid to the masters and owners of the several steamers and other vessels employed in the relief of the troops taken from the San Francisco, wrecked during a violent storm in December last; and forty-two thousand dollars was paid to the Mail Steamship Company for demurrage on the steamer Golden Gate, detained at Panama during an outbreak of cholera among the officers and soldiers of the 4th regiment of infantry en route to California.

Repairs have been made, and buildings where necessary constructed, at the several posts throughout the Union, at a cost of three hundred and one thonsand three hundred and thirty-five dollars.

No report has been received of the progress of the work on the Minnesota river, authorized by Congress in March, 1853; but as the expenditures on account of the work amount to more than nineteen thousand dollars, considerable progress has no doubt been made.

Of the works authorized by Congress on the Kansas river, (Fort Riley,) Major Ogden, who has the direction of the work, reports the erection of three double blocks of officers' quarters, and four sets of soldiers' barracks: two of the latter require shingling, flooring, and plastering. These buildings when completed will afford accommodation for four full companies. To complete the works at that post the amount included in my estimate, $29,300, will be necessary. On the road from Fort Leavenworth to this post bridges have been erected, purchased, or hired, over all the streams but two, which can be readily bridged when required.

At the Presidio San Francisco, and at Forts Humboldt and Vancouver, buildings have been erected; and at Benicia and other posts on the Pacific extensive repairs have been made. New posts have been established in New Mexico and Texas, and repairs have been made at most of the old posts occupied by the troops. For the construction and repair of buildings throughout the Union the whole sum estimated will be required.

For the rent of quarters, barracks, storehouses, wharves, grounds for military stations in our new territories, including Texas and California, one hundred and fifteen thousand four hundred and fifteen dollars were expended; this expenditure cannot be materially reduced, but it is believed it will necessarily be increased, as new posts will have

to be occupied in Texas, where the United States own no lands, and where the sites of all posts required to be occupied must be rented. A modification of existing laws which prohibit the purchase of lands for military purposes, except by an act of Congress in each case, so as to authorize the President and Secretary of War to purchase such sites on the frontier as the security of the country and the protection of the people require should be permanently occupied, is not only desirable, but is indispensable to the efficiency of the service and the security of the treasury.

On the line of the Rio Grande, as well as on the northern frontier of Texas, extensive buildings have been erected on the lands of private individuals, all of which will ultimately revert to the owners of the lands, or will greatly increase the price of them should the government have to become the purchaser.

In connexion with this subject it may be proper to remark that there are many sites, no longer necessary for military purposes, which have become very valuable in consequence of the expenditures of the government, and the protection given to settlers in their neighborhood, which, if sold for their full value, would supply a fund sufficient, or nearly so, for all new frontier improvements. The Secretary of War has, probably, now authority to sell these sites; but whether or not a modification of the law for their sale, so as to authorize the fixing of a minimum something like their intrinsic value, below which no sale shall take effect or be considered legal, is required for the protection of the public interests. The reserves at Fort Howard, Fort Snelling, Fort Crawford, and Rock Island, should it not be made a military depot, if sold for anything like their value, would bring into the treasury more than a million of dollars. Without such a modification of the law, there is great danger, should these valuable lands be offered for sale, that unprincipled and lawless speculators will combine, and, by threats of violence, intimidate honest and peaceable citizens from bidding for them, and thus secure for themselves and their confederates the whole of them, at the minimum price of the government for its wild lands.

The balances of the several items of the appropriation now in the treasury, and in the hands of disbursing officers, will be sufficient, it is believed, for the wants of the service during the remainder of the year, except for transportation and clothing. During the last fiscal year there were many heavy charges upon the appropriation for transportation which were not foreseen, such as those for the relief of the San Francisco, demurrage for the detention of the Golden Gate and other vessels, and for general averages. In addition to which, the whole force on the frontier, and in the new territories, has been in almost constant movement, like armies in the field; and the cost of transportation has been, therefore, upon a war scale. On the first of the present month, when two-thirds of the year remained to be provided for, there was less than half the appropriation for transportation in the treasury. The reductions under the incidental head have been such that it is believed about three hundred thousand dollars can be spared for transportation from that head, and authority is respectfully asked to apply that amount. Should it be ascertained that that sum will not be sufficient for the

service during the remainder of the year, an estimate for the further deficiency can be submitted during the session of Congress.

Only sixty thousand five hundred and eighty-five dollars of the appropriation for clothing remains in the treasury. It is ascertained that accounts accruing in the fiscal year terminating the 30th of June, 1853, amounting in the aggregate to eighty thousand two hundred and ninety-four dollars and sixty-two cents, have been paid within the last fiscal year from the appropriation for that year; and during the same period the sum of fifty thousand six hundred and ninety dollars and sixty-nine cents was taken from the appropriation for clothing and applied to the settlement of paymasters' accounts at the treasury; and the appropriation received a credit of twenty-five thousand four hundred and sixty-five dollars and thirty-three cents; thus making a charge upon the appropriation, not provided for, of one hundred and five thousand five hundred and nineteen dollars and ninety-eight cents. At least a hundred thousand dollars in addition to the balance in the treasury will be necessary to provide for the service during the remainder of the year.

The estimate for the next fiscal year is, under every head, reduced to the lowest sum which a proper regard for the efficiency of the service will admit. The item for fuel is ten thousand dollars, and that for forage fifty thousand dollars, less than the appropriations for the present year, and the items for straw and stationery are the same as those for the present year.

The estimate for the incidental expenses is the same, within a small fraction, as the appropriation for this year. Mounts and remounts have been increased fifty thousand dollars. Contingencies of the army are the same. Mileage to officers, or transportation of themselves and baggage when moving on duty without troops, has been reduced twenty thousand dollars, not because the estimates have been heretofore too large, but because there is a balance of a former appropriation which it is believed will be applicable to the service of the next year.

The item for barracks and quarters has been reduced; and that for transportation is the same as for the present year. I feel more doubt about the sufficiency of this item than of any other item in the estimate. The expenditures under this head cannot be controlled, but must depend, no matter who may be at the head of the War Department, or in command of the troops, upon the exigencies of the service.

The item for clothing is greater than the appropriation for the present year, for the same reasons assigned in my last report, and for the additional reason that I have added fifty thousand dollars to meet the payments which paymasters may be called upon to make to discharged soldiers for clothing not drawn during their period of service. An appropriation is necessary on this account from the fact that clothing is always provided for the whole force in service, because it may all be called for. But many of the old soldiers, by care and economy, make a part of their clothing serve them during their whole service, and have thus a fund in reserve, which is paid to them on their discharge from the service. The value of the clothing thus undrawn goes to swell the general stock, and is always deducted from the estimate presented to Congress.

In the operations about to be commenced in Florida, I think the

service would be greatly benefited by placing a small steamer on Lake Okeechobee. A suitable boat, constructed of iron, could be taken in parts or sections to the shore of the lake, and be put together there. A boat of the kind suggested, capable of carrying a company, and towing two or more canoes, would be worth a regiment. No man is better qualified to make the best use of such a boat than the present commander in Florida, for when a captain, and acting under my orders, he explored every part of the Okeechobee in canoes or row-boats. Had I remained in Florida, I would have placed a small steamer on that lake in 1838, and I respectfully recommend that it be done now.

I respectfully ask attention to the recommendations in my last annual report as to the increase of the store-keepers of the department, the increase of the compensation and the enlargement of the sphere of duties of the ordnance sergeants, the charging of a single auditor with the settlement of all accounts of the Quartermaster's department, the allowance of a reasonable extra compensation to officers of the line temporarily employed as disbursing officers, and the improvement of the roads and other avenues of communication to and between the posts on the frontiers.

I have the honor to be, your obedient servant,

TH. S. JESUP,
Quartermaster General.

Hon. JEFFERSON DAVIS,
Secretary of War, Washington City.

REPORT OF THE COMMISSARY GENERAL.

OFFICE COMMISSARY GENERAL OF SUBSISTENCE,
Washington, October 16, 1854.

SIR: I have the honor to submit the following report of the operations of this department during the past year, and to transmit herewith an estimate for the subsistence of the army for the fiscal year ending June 30, 1856.

The posts on the northern frontier, Atlantic seaboard, and western frontiers of the old States, have been furnished with subsistence by contract. The troops west of Arkansas, in Texas, New Mexico, California, and Oregon, have been supplied by purchase in the open markets of the old States and countries adjacent to the posts. At all points it is believed that the troops have been amply supplied with good and wholesome provisions.

Issues have been made to Indians at many of our posts with a beneficial influence, it is believed, in our relations with them.

The experiments to test the value of the solar evaporated salt of Syracuse, as compared with Turk's Island salt, for curing and preserving pork, are approaching their termination, and in a few months a report will be made showing the results.

Believing the prices of subsistence have reached their maximum, the price of the ration has not been increased in the present estimates beyond that of this year.

The accounts of the officers doing duty in this department have, in general, been punctually rendered; the few exceptions being caused by the character of the service, and the frequent necessity of the officer being separated from his papers.

I am, sir, with great respect, your obedient servant,

GEO. GIBSON,
Commissary General of Subsistence.

Hon. JEFFERSON DAVIS,
Secretary of War.

REPORT OF THE PAYMASTER GENERAL.

PAYMASTER GENERAL'S OFFICE,
November 9, 1854.

SIR: I have the honor to submit herewith a report of the transactions of the pay department for the fiscal year ending the 30th of June, 1854.

It will be seen by the tabular statement herewith that there remained in the hands of paymasters on the 30th of June, 1853, applicable to payments due in the first quarter of the last fiscal year, the sum of $490,932 86, in addition to which they have received from the treasury and other sources, exclusive of amounts transferred from one to another, the sum of $2,574,137 53, making a total to be accounted for of $3,065,070 39.

Expended as follows:

Payments to regular troops	$2,608,330 24
Payments to volunteers	41,053 90
Three months' extra pay to regulars	5,214 90
Three months' extra pay to volunteers	8,241 50
In paying the Military Academy	86,591 52
Total expended	2,749,432 06
Leaving a balance of	315,638 33

These balances have, as far as heard from, been expended and accounted for since the commencement of the present fiscal year.

As far as returns have been received the troops have all been paid to 31st of August last.

The facilities afforded by the Treasury Department for the safekeeping of the public funds have relieved the officers of the department from serious embarrassment; and, it is believed, will prove beneficial to the government as well as the disbursing officers.

Respectfully, your obedient servant,

BENJ. F. LARNED,
Paymaster General.

Hon. JEFFERSON DAVIS,
Secretary of War.

Statement showing the amount remaining in the hands of each of the disbursing officers of the Pay department, and unaccounted for, on the 1st of July, 1853; the amount remitted to each from the treasury, or turned over by other agents, during the fiscal year ending the 30th June, 1854; the amount accounted for by accounts and vouchers of expenditure, or by transfer or replacements in the treasury; and the balance unaccounted for, to be applied to payments in the first quarter of the next fiscal year.

Paymasters.	Balances in hand and unaccounted for on the 1st July, 1853.	Am'nt remitted from the treasury, and turned over by other agents, during the year ending 30th June, 1854.	Total received, to be accounted for.	Amount expended in paying regular troops.	Amount expended in paying volunteers.	Am'nt paid for "three months' extra pay" to discharged regular troops.	Am'nt paid for "three months' extra pay" to volunteers.	Amount expended in paying the Military Academy.	Amount turned over to other agents, or replaced in the treasury.	Total accounted for.	Balances unaccounted for, to be applied to payments in the next fiscal year.
T. J. Leslie	$5,850 78	$720,585 63	$726,436 41	$352,103 76	$4,623 85	$1,285 20	$1,215 50	.....	$365,480 29	$724,708 60	$1,727 81
A. D. Stewart	9,781 63	437,473 84	447,255 47	69,541 18	691 56	.....	.....	.....	358,248 79	428,481 53	18,773 94
Benjamin Walker	2,612 96	188,807 92	191,420 88	84,991 96	3,514 10	111 00	783 00	.....	79,179 46	168,579 52	22,841 36
E. Van Ness	15,622 33	130,706 77	146,329 10	141,831 87	1,333 78	132 00	21 00	.....	2,100 00	145,418 65	910 45
St. Clair Denny	9,994 14	262,811 51	272,805 65	190,190 12	12,991 29	2,537 20	3,221 00	.....	47,669 92	256,609 53	16,196 12
David Hunter	3,328 36	274,491 17	277,819 53	144,684 31	.....	63 00	.....	$86,591 52	43,140 58	274,479 41	3,340 12
L. J. Beall	11,942 21	50,073 94	62,016 15	55,797 02	1,056 89	42 00	42 00	.....	216 50	57,154 41	4,861 74
A. J. Coffee	127,607 07	519,013 13	646,620 20	82,469 71	1,403 02	219 00	372 00	.....	553,753 93	638,217 66	8,402 54
G. H. Ringgold	14,140 63	96,422 97	110,563 60	105,343 30	1,009 35	324 00	222 00	.....	253 50	107,152 15	3,411 45
Henry Hill	12,827 37	117,944 55	130,771 92	67,325 30	202 73	42 00	.....	.....	29,894 00	97,464 03	33,307 89
R. B. Reynolds	2,985 25	89,973 41	92,958 66	81,782 75	77 17	63 00	.....	.....	12 03	81,934 95	11,023 71
J. Y. Dashiell	14,769 29	238,802 62	253,571 91	198,817 44	183 71	105 00	.....	.....	17,044 55	216,150 70	37,421 21
S. Maclin	4,160 69	108,834 43	112,995 12	88,943 92	110 00	54 00	.....	.....	1,801 29	90,909 21	22,085 91
A. W. Gaines	3,536 66	69,141 27	72,677 93	68,108 56	332 94	150 50	198 00	.....	171 00	68,961 00	3,716 93
A. G. Bennett	.....	3,000 00	3,000 00	1,328 60	.....	.....	.....	.....	389 60	1,718 20	1,281 80
H. Leonard	45,764 44	407,925 65	453,690 09	185,302 44	9,575 36	66 00	1,112 00	.....	217,688 00	413,743 80	39,946 29
F. A. Cunningham	71,546 92	141,470 34	213,017 26	130,363 27	861 51	21 00	45 00	.....	80,051 65	211,342 43	1,674 83
G. C. Hutter	2,137 83	113,951 29	116,089 12	69,119 56	94 02	.....	.....	.....	20,000 00	89,213 58	26,875 54
A. J. Smith	9,018 83	143,647 97	152,666 80	146,426 50	1,210 82	.....	566 00	.....	60 00	148,263 32	4,403 48
N. W. Brown	11,760 81	89,366 35	101,127 16	93,069 46	487 80	.....	.....	.....	.....	93,557 26	7,569 90
A. S. Johnston	.....	75,203 36	75,203 36	58,126 31	698 12	.....	175 00	.....	146 50	59,145 93	16,057 43
J. R. Hagner	878 87	106,963 55	107,842 42	50,304 57	497 56	.....	.....	.....	48,210 10	99,012 23	8,830 19
B. W. Brice	9,265 79	72,810 64	82,076 43	50,867 08	.....	.....	245 00	.....	29,489 41	80,601 49	1,474 94
Cary H. Fry	101,400 00	59,716 32	161,116 32	91,491 25	98 32	.....	24 00	.....	50,000 00	141,613 57	19,502 75
	490,932 86	4,519,138 63	5,010,071 49	2,608,330 24	41,053 90	5,214 90	8,241 50	86,591 52	1,946,001 10	4,694,433 16	315,638 33

PAYMASTER GENERAL'S OFFICE, *November* 9, 1854.

BENJ. F. LARNED, *Paymaster General.*

REPORT OF THE SURGEON GENERAL.

SURGEON GENERAL'S OFFICE,
November 8, 1854.

SIR: I have the honor to lay before you a statement of the fiscal transactions of the medical department, and a report upon the sickness and mortality of the army, for the year ending on the 30th June, 1854.

The amount of the appropriation for the medical and hospital department remaining on the 30th of June, 1853, was—

In the hands of disbursing agents		$1,528 80	
In the treasury of the United States		33,842 70	
Amount appropriated per act approved March 3, 1853		52,000 00	
Amount refunded by Colonel H. Whiting		1,025 92	
Amount refunded by Colonel T. F. Hunt		548 67	
Amount refunded by W. Williams		31 89	
			$88,977 98
Of this sum there has been expended on account of pay and other claims of private physicians contracted in—			
1847	$128 57		
1848	597 03		
1849	1,253 18		
1850	2,217 65		
1851	3,619 31		
1852	1,771 06		
1853	5,712 40		
1854	8,129 31		
		23,428 51	
On account of medical supplies, &c.—			
1847	5 50		
1848	517 59		
1849	402 08		
1850	382 98		
1851	674 35		
1852	912 40		
1853	1,721 61		
1854	24,621 63		
		29,238 14	
Total amount expended		52,666 65	
Leaving in the hands of disbursing agents	$4,911 66		
And in the treasury of the United States	31,399 67		
		36,311 33	
			88,977 98

It appears from the foregoing exhibit that the total expenditure on account of the medical department of the army, during the year ending on the 30th of June, 1854, was fifty-two thousand six hundred and sixty-six dollars and sixty-five cents, ($52,666 65.) Of this sum, fifteen thousand two hundred and ninety-nine dollars and twenty cents ($15,299 20) were paid on account of the claims of private physicians for services rendered, and four thousand six hundred and sixteen dollars and fifty-one cents ($4 616 51) for medical and hospital supplies

purchased—both accounts originating prior to the commencement of the last fiscal year; leaving as the expenditure proper of the medical bureau for the service of that year the sum of eight thousand one hundred and twenty-nine dollars and thirty-one cents ($8,129 31) for pay of private physicians, and twenty-four thousand six hundred and twenty-one dollars and sixty-three cents ($24,621 63) on account of medical supplies—making a total of thirty-two thousand seven hundred and fifty dollars and ninety-four cents, ($32,750 94.)

The annual report of the sick and wounded of the army, as consolidated in the tabular statement herewith transmitted, exhibits the following results:

The number of officers and men remaining sick on the 30th of June, 1853, was 658; and the number of cases of disease which occurred during the succeeding year was 24,998, making an aggregate of 25,656 cases that have been under medical treatment within the twelve months ending June 30, 1854.

Of the whole number of sick, 24,570 "returned to duty," 25 were placed "on furlough," 181 were "discharged service," 51 "deserted," and 258 "died;" leaving 271 "sick" and 300 "convalescents" still under medical treatment.

The mean strength of the army for the year ending June 30, 1854, was, according to the returns in this office, 8,095; and, as the number of cases of sickness reported for the same period was 24,998, the relative proportion of cases of disease to the number of officers and enlisted men in the army was 3.08 to 1; so that, on an average, each individual was sick three times during the year.

It also follows from the foregoing data, that the ratio of deaths to the number of officers and enlisted men was 1 to 31.37, or 3.18 per cent; and that the proportion of deaths to the number of cases of disease treated during the year was 1 to 99.44, or 1.005 per cent.

The increased ratio of mortality exhibited by this report, as compared with those for the two preceding years, arises from epidemic cholera, and also from the prevalence of yellow fever which so terribly ravaged a great portion of the southern and southwestern States in the summer and fall of 1853. Of the former disease there were thirty-one cases and eighteen deaths, and of the latter three hundred and forty cases are reported, of which eighty-three died.

The mortality in the army generally, during the last year, as has been shown, was greater than the ordinary average in time of peace; but the number of deaths among the officers of the medical staff, within the last sixteen months, has been extraordinarily great, the proportion being one in twelve, or eight per cent.—a mortality among officers seldom exceeded, except in war.

Although we have been called upon to mourn the loss not only of many of our number, but of some of our best and most distinguished officers, it will be doing no injustice to others, whether of the living or of the dead, to render a richly-merited tribute of respect to the memory of Surgeon Thomas G. Mower, for many years the senior surgeon of the army, its chief medical purveyor, and the presiding officer of its boards of medical examiners. During a service of forty-one years he

had frequently confided to him the highest and most responsible duties, all of which were invariably performed to the satisfaction of the department. To the judgment and discretion with which he exercised the power delegated to him as president of the army boards of medical examiners the medical staff owes much of its present efficiency and reputation; and it is hoped that the influence of his example will not be lost.

The meteorological observations commenced under the auspices of this bureau in 1819 have been steadily continued at all the military posts occupied by troops, and monthly registers thereof have been regularly transmitted to this office. The results of these observations, from the commencement to 1842, inclusive, have been published, and those from that period to 1850 have been arranged and tabulated, and are now ready for the press.

The observations taken at the stations in Texas, New Mexico, California, and in Oregon and Washington Territories, which have been established since the war with Mexico, have proved of special value to the science of meteorology, by affording the necessary data for determining the mean temperatures, fall of rain, and other climatic peculiarities of the region lying between the western and southwestern States and the shores of the Pacific. In order that the observations might be made of as much practical benefit as possible, the meteorological registers have been freely loaned to the Smithsonian Institution and to officers of the army in charge of the recent surveys for a railroad route to the Pacific; and it is to data obtained from this office that the paper on "agricultural climatology of the United States," appended to the report of the Commissioner of Patents for the year 1853, owes much of its completeness.

The army medical board for the examination of assistant surgeons for promotion, and of applicants for appointment in the medical department of the army, to which reference was made in my last annual report, convened in the city of New York on the 1st day of December, 1853, in obedience to your orders, and remained in session more than two months. By this board twelve assistant surgeons were examined; all of whom having been approved, they were recommended for promotion.

Of the forty-nine candidates for appointment in the medical staff of the army invited to present themselves for examination, thirty-three reported in person, and one by letter; two withdrew voluntarily without an examination, five withdrew at a more or less advanced period of their professional examination, three were found physically disqualified, and twenty-four were fully examined; and of these last, fifteen were found qualified for appointment. All the candidates approved by the medical board of 1851 have been commissioned, as have also four of those who received favorable reports from the last board, leaving eleven candidates legally qualified for the appointment of assistant surgeon in the army.

The numerical strengh of the medical staff being inadequate to the demands of the service, a number of private physicians have been for some years past necessarily continuously employed at the different arsenals, and at military posts in the vicinity of towns; and although I

have concluded to refrain from recommending, at this time, any addition to the present number of medical officers, an increase will be absolutely necessary in the event of new regiments being added to the present military establishment. I am the more particular in making this statement, for the reason that, in the several bills before Congress at its last session, having for their object the creation of an additional military force, no provision was made for a corresponding increase of the medical department.

I cannot, consistently with my sense of duty, close this report without earnestly inviting your attention to and renewing the several recommendations made in my last annual report, and which have for their object—

1st. That soldiers acting as nurses and attendants in hospitals be allowed the extra pay authorized to other soldiers on fatigue duty by "an act approved March 2, 1819," the provisions of which were extended by "An act to increase the pay of the rank and file of the army," &c., approved August 4, 1854, by which soldiers employed on "constant labor of not less than ten days are entitled to receive twenty-five cents per day at stations east of, and thirty-five cents per day at stations west of the Rocky mountains."

2d. The enlistment of a certain number of qualified persons to serve specially as hospital stewards.

3d. That the assistant surgeons of the army be relieved from the operation of the proviso to section 1st of "An act making appropriations for the support of the army for the year ending June 30, 1846," approved March 30, 1845, by which their allowance of forage ceased to correspond with that of cavalry officers of the same grade, as established by the 24th section of "An act to increase the present military establishment of the United States, and for other purposes," approved July 5, 1838, and which is still unrepealed.

All of which is respectfully submitted.

TH. LAWSON,
Surgeon General.

Hon. JEFFERSON DAVIS,
Secretary of War.

Quarters.	REMAINING LAST REPORT.			TAKEN SICK OR RECEIVED INTO HOSPITAL DURING THE YEAR.												
				Fevers.							Eruptive fevers.					
	Sick.	Convalescent.	Total.	Febris Continua communis.	Febris intermittens quotidiana.	Febris intermittens tertiana.	Febris intermittens quartana.	Febris remittens.	Febris typhus.	Febris typhus icterodes.	Erysipelas.	Rubeola.	Scarlatina.	Variola.	Varioloid.	Vaccinatio.
September 30, 1853	.....	.....	.....	46	1,131	934	12	194	12	86	5	.....	.....	.....	.....	.....
December 31, 1853	.....	.....	.....	29	883	673	10	53	20	245	8	.....	.....	.....	9	3
March 31, 1854	.....	.....	.....	31	429	481	12	27	7	.....	2	2	.....	9	3	4
June 30, 1854	.....	.....	.....	24	558	727	34	71	3	9	4	1	.....	.....	.....	6
Grand total	354	304	658	130	3,001	2,815	68	345	42	340	19	3	.....	9	12	13
Causes of death	.....	.....	.....	.....	1	.....	1	6	11	83	.....	.....	.....	.....	.....	.....

Annual report of the sick and wounded of the army—Continued.

Quarters.	TAKEN SICK OR RECEIVED INTO HOSPITAL DURING THE YEAR. Diseases of the organs connected with the digestive system.																	
	Cholera.	Colica.	Cynanche parotidæa.	Diarrhœa.	Dysenteria acuta.	Dysenteria chronica.	Dyspepsia.	Enteritis.	Gastritis.	Hæmatemesis.	Hepatitis acuta.	Hepatitis chronica.	Icterus.	Obstipatio.	Peritonitis.	Tonsillitis.	Cholera epidemic.	Endo carditis.
September 30, 1853	32	129	3	951	171	15	37	7	25	1	3	2	1	284	11	28	1	.....
December 31, 1853	9	74	2	522	274	13	14	7	8	2	3	2	2	195	2	41	.....	.....
March 31, 1854	6	46	4	369	124	12	19	4	7	.....	4	2	2	159	1	72	.....	.....
June 30, 1854	31	73	2	763	140	27	17	3	13	5	4	1	5	280	1	46	30	.....
Grand total	78	322	11	2,605	709	67	87	21	53	8	14	7	10	918	15	187	31	.....
Causes of death	4	.....	.....	12	4	7	.....	2	2	.....	1	.....	.....	.....	3	.....	18	1

Annual report of the sick and wounded of the army—Continued.

Quarters.	TAKEN SICK OR RECEIVED INTO HOSPITAL DURING THE YEAR.																							
	The respiratory system.											The brain and nervous system.											
	Asthma.	Bronchitis acuta.	Bronchitis chronica.	Catarrhus.	Hæmoptysis.	Laryngitis.	Phthisis pulmonalis.	Pleuritis.	Pneumonia.	Influenza.	Gangrene of lungs.	Apoplexia.	Cephalalgia.	Chorea.	Delirium tremens.	Epilepsia.	Mania.	Melancholia.	Meningitis.	Neuralgia.	Paralysis.	Tetanus.	Congestio cerebri.	Cerebritis.
September 30, 1853...	4	21	7	258	10	1	12	36	18	.....	....	3	112	....	27	10	6	1	1	40	3	1	1	....
December 31, 1853...	5	90	6	459	6	....	11	27	9	.....	....	2	60	2	26	3	5	3	....	22	1	....	....	....
March 31, 1854.....	6	118	9	799	5	5	4	31	24	24	....	1	72	....	23	9	3	....	1	25	....	1	1	....
June 30, 1854.....	3	45	10	341	2	....	....	15	11	.....	....	2	62	....	25	7	6	2	1	28	2	....	....	1
Grand total.....	18	274	32	1,857	23	6	27	109	62	24	....	8	306	2	101	29	20	6	3	115	6	2	2	1
Causes of death....	....	.....	4	.....	2	....	14	.....	6	.....	1	5	.....	....	11	.....	1	....	1	.....	....	2	2	1

Annual report of the sick and wounded of the army—Continued.

Quarters.	TAKEN SICK OR RECEIVED INTO HOSPITAL DURING THE YEAR.																		
	The urinary and genital organs.												The serous exhalent vessels.			The fibrous and muscular structures.			
	Calculus.	Cystitis.	Diabetes.	Enuresis.	Gonorrhœa.	Ischuria et dysuria.	Nephritis.	Orchitis.	Stricture urethræ.	Syphilis primitiva.	Syphilis consecutiva.	Ulcus penis non syphiliticum.	Anasarca.	Ascites.	Hydrocele.	Pernio.	Podagra.	Rheumatismus acutus.	Rheumatismus chronicus.
September 30, 1853..	4	.....	3	1	85	6	1	18	12	52	28	1	4	1	.....	1	1	108	57
December 31, 1853...	.....	.....	.....	1	79	4	2	16	1	35	32	5	4	1	3	3	3	150	75
March 31, 1854.....	.....	2	1	.....	83	2	2	21	1	43	46	1	3	.....	.....	52	1	171	74
June 30, 1854.....	.....	3	.....	.....	115	5	4	23	3	62	32	.....	3	2	.....	2	.....	131	86
Grand total.....	4	5	4	2	362	17	9	78	17	192	138	7	14	4	3	58	5	560	292
Causes of death ...	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1	2	.....	.....	.....	1	1

Annual report of the sick and wounded of the army—Continued.

Quarters.	TAKEN SICK OR RECEIVED INTO HOSPITAL DURING THE YEAR.															
	Abscesses and ulcers.			Wounds and injuries.												
	Fistula.	Phlegmon et abscessus.	Ulcus.	Ambustio.	Amputatio.	Concussio cerebri.	Contusio.	Fractura.	Luxatio.	Punctio.	Subluxatio.	Vulnus incisum.	Vulnus lacceratum.	Vulnus punctum.	Vulnus sclopeticum.	Vulnus contusum.	Anchylosis.
September 30, 1853	8	520	124	25	3	2	434	26	24	1	125	123	59	21	10	7	1
December 31, 1853	4	342	117	24	4	2	363	14	12	.....	138	89	52	22	12	6	.....
March 31, 1854	7	282	134	21	3	8	370	17	9	3	103	101	57	23	49	10	1
June 30, 1854	3	327	106	16	2	2	382	12	14	.....	118	89	38	27	19	5	1
Grand total	22	1,471	481	86	12	14	1,549	69	59	4	484	402	206	93	90	28	3
Causes of death	.....	.....	.....	1	.....	1	.....	1	.....	.....	.....	.....	1	4	26	.....	.....

Annual report of the sick and wounded of the army—Continued.

Quarters.	TAKEN SICK OR RECEIVED INTO HOSPITAL DURING THE YEAR.																			
	All other diseases.																			
	Amaurosis.	Angina pectoris.	Cachexia.	Debilitas.	Ebrietas.	Exostosis.	Hæmorrhois.	Hemeralopia et nyctalopia.	Hernia.	Morbi cutis.	Morsus serpentis.	Necrosis.	Odontalgia.	Ophthalmia.	Otitis.	Pericarditis.	Prolapsus ani.	Scorbutus.	Scrofula.	Splenitis.
September 30, 1853	2	1	12	38	99	1	34	8	12	84	3	....	52	85	37	2	2	64	1	....
December 31, 1853	2	6	3	33	82	....	37	6	8	31	2	....	74	67	24	1	....	6	2	3
March 31, 1854	1	2	.....	28	73	....	26	9	9	28	1	....	54	61	20	1	....	32	2	....
June 30, 1854	....	....	1	45	77	....	26	9	10	35	6	1	41	80	19	2	....	93	1	4
Grand total	5	9	16	144	331	1	123	32	39	178	12	1	221	293	100	6	2	195	6	7
Causes of death	....	....	.....	2	2	....	1	.....	.....	.....	.....	....	.....	.....	.....	....	....	1	....	....

Annual report of the sick and wounded of the army—Continued.

Quarters.	TAKEN SICK OR RECEIVED INTO HOSPITAL DURING THE YEAR.																REMAINING.		
	All other diseases.																		
	Suicidium.	Toxicum.	Varix.	Vermes.	Hypertrophy of heart.	Ictus solis.	Drowned.	Cause not reported.	Morbi varii.	Total.	Aggregate.	Returned to duty.	On furlough.	Discharged service.	Deserted.	Dead.	Sick.	Convalescent.	Total.
September 30, 1853	----	6	7	4	3	5	----	----	416	7,567	------	------	7	58	13	54	------	------	------
December 31, 1853	----	4	4	2	3	----	----	----	376	6,231	------	------	5	38	8	95	------	------	------
March 31, 1854	1	3	3	8	2	----	----	----	325	5,389	------	------	6	45	14	55	------	------	------
June 30, 1854	----	12	6	5	1	2	----	----	262	5,811	------	------	7	40	16	54	------	------	------
Grand total	1	25	20	19	9	7	----	----	1,379	24,998	25,656	24,570	25	181	51	258	271	300	571
Causes of death	2	2	----	----	------	----	1	1	------	258	------	------	----	------	----	------	------	------	------

Annual report of the sick and wounded of the army—Continued.

Quarters.	MEAN STRENGTH.		
	Officers.	Enlisted men.	Total.
September 30, 1853	453	7,978	8,431
December 31, 1853	480	7,496	7,976
March 31, 1854	491	7,877	8,368
June 30, 1854	435	7,170	7,605
Aggregate			32,380
Average			8,095

TH. LAWSON, *Surgeon General.*

REPORT OF THE CHIEF ENGINEER.

ENGINEER DEPARTMENT,
Washington, November 29, 1854.

SIR: I have the honor to report to you the condition of those branches of the public service that are committed to the superintendence of this department.

FORTIFICATIONS.

I have on so many occasions discussed, in annual and special reports, the various questions connected with a general system of defence for our exposed frontiers, that I shall now restrict myself to a mere summary of the objects and main features of the system which has now been for many years in hand; and in which, though great progress has been made, there yet remain unprotected several very important points. And I shall now offer this summary, only because the design and extent of the system have been, of late, much misunderstood and misrepresented.

It may not be inopportune to introduce a few observations on the influence exercised by sea-coast fortifications on the operations of a great war as illustrated during the present season.

These designs of our system of defence may, in general terms, be stated to be to protect, by adequate fortifications, all those points on our frontiers that, either on account of *their own proper value*, or of their *value as centres of business*, or as *establishments for naval or military preparations*, or as *bases of naval or military operations*, would, in time of war, be apt to excite the enterprise or tempt the cupidity of an enemy. A few only excepted, all our accessible points, of this nature, are to be found on our sea-coast frontier.

Among the many points on our coast liable to attack, there are gradations in value, from those for which we can hardly do too much, to such as may, without great risk, be left to means of defence to be provided on the approach of a war, or in moments of danger. It has never been intended that places of but little importance should be otherwise provided for; not, at any rate, until all the more important places had been secured, or these had grown into greater consequences.

The places of importance for which we have to provide further defences, and which (with one exception) are included in our present estimates, are New York and its navy yard, Philadelphia and its navy yard, Boston and its navy yard, Portsmouth and its navy yard, Norfolk and its navy yard, Pensacola and its navy yard, Baltimore, Charleston, Savannah, Mobile, New Orleans, Key West, and the Tortugas, (points which are to stand guard over the commerce of the Gulf of Mexico,) San Francisco, &c., &c.

Among these places, and two or three others also included in the annual estimates, there are gradations of value, undoubtedly. There is also a difference as to the progress already made in works for their protection. But there can be no doubt of the necessity of providing for each one of them by appropriations proportionate, at the same time, to its value in the system, and to the state of advancement of its defences. That there is still so much to do at some of them, is no fault of this department, which has repeatedly urged that larger appropriations were necessary to an early state of efficiency, and that by larger appropriations there would be a real saving in the ultimate cost.

The estimates for the coming year, which contemplate the prosecution of defensive works at the important places mentioned above, and also some repairs at fortifications already existing, are adjusted to previous rates of appropriations, rather than to the progress that would be most advantageous; and, therefore, I must not omit to add that, in case of urgency, large additions will have to be made to several of the items.

It may be well, moreover, here to repeat an idea that I have often presented in this connexion—namely, that time, to a certain extent, is not less necessary than money, and that, to this necessary extent, neither money, nor anything that money may effect, can be substituted for it; in other words, that adequate and reliable fortifications cannot, for the objects we are considering, be extemporized. They may be hastened by money, and there will be economy, as well as other advantages, in rapid progress; but a portion of time is indispensable in every case, and this length of time is greater, as a general rule, according to the magnitude and importance of the object to be covered. This length of time, moreover, is always greater with objects of any importance—greater, by far, than any special forecast as to impending political changes in the world can provide for. Strong and efficient permanent fortifications can be the work neither of weeks nor months; the time must be reckoned by *years*.

The augmentation, within late years, of the power of naval armaments, in the force of ships, the size of fleets, and rapidity of movement, places more and more out of the question the idea of supplying adequate resistance by sudden constructions or impromptu resorts. On the contrary, these really great modern improvements, by the speed and power they have added, make it more than ever necessary to secure an *early* provision of well-tried means of defence; they more than ever exact *powerful* defences; and they, besides, require the defence, by forts and batteries, of channels and passages that were before protected by their shallowness.

That fortifications are an approved and reliable kind of defence in such situations as ours, and that they may be made powerful enough to protect objects of the very highest value, has been demonstrated to the world in the campaign of the present year.

There have never before been naval expeditions to compare, in power and efficiency, with the allied fleets that, during the past summer and autumn, have been defied and paralyzed by the Russian fortifications in the Baltic. Confessing themselves unequal to a conflict with these batteries, after months of reconnaissance and hesitation,

these fleets are turning back into their own ports, attempting nothing, for, as compared with the enormous marine preparation, the results have been absolutely null. The naval mastery in that sea, the blockade of the Russian coasts, and all else that was accomplished, could have been as well effected with comparatively moderate means.

The rich and vast establishments that had built up, and were rapidly augmenting the Russian navy in the north, were objects worthy of the greatest efforts of the powers that undertook their overthrow. And nothing seems to have been spared that could give vigor and confidence to an enterprise overflowing with the supplies of the richest dock-yards of the world, cheered on by the acclamations of governments and people, and led by great martial experience and world-renowned gallantry.

The general result of all these vast preparations, that none can fail to see and understand, is in accordance, moreover, with the circumstances attending the only contest of the campaign—that of Bomersund—in which, for the reduction of a seacoast fortification of but little relative value or strength, notwithstanding the presence of these great fleets, a large land force was taken forward and made to apply the process of a regular siege. That the fort was only reduced by such means is certain, for we have the details of the operation. That such a proceeding was absolutely necessary in the presence of those great fleets, may not perhaps be safely insisted on. But it was a wise choice of means. And that it was resorted to is an instructive fact to all who are willing to learn in military matters from the history and practice of nations versed in all the resorts of war.

The operations of the allied navies in the Black sea are a repetition of the same instructive lessons; showing, besides, that no variations in local peculiarities, in climate, in the abilities and character of the commanders—that, in short, no circumstances, connected with a proper use of means, will materially effect the sufficiency against naval attacks of good fortifications.

Without such defences, a large division of the Russian navy, and all the Russian ports in that sea, would, undoubtedly, have been mastered in the early weeks of the season; because, neither uncovered armies, however numerous, nor hastily executed batteries, could have resisted the allied fleets. Instead of which, nothing serious could be undertaken against them, until, in the course of months, large armies had been brought a long distance, at an enormous expense.

How clearly is it seen here that the fortifications of these large Russian ports in the Black sea have governed the course, and perhaps decided the final issue, of the campaign. If they fall, it will not be because they were unable to resist these fleets, but because the time consumed by their defence of this portion of the Russian empire has been less profited of to bring succor forward to the defence than reinforcements to the attacking armies.

Whatever may be the issue of the present land attack upon Sebastopol, there can be no doubt that the seaport fortifications in the Black sea, as in the Baltic, have fully and perfectly accomplished the object for which they were designed—namely, *security* against *naval* attack. This would seem to be placed beyond all cavil or doubt. And this

carries with it the further truth, that formidable defences of that nature require, for their reduction, the presence of land forces.

This lesson is the more impressed on our minds just now, because of the magnitude and freshness of this year's illustration. But it is no new lesson; the same has been heretofore illustrated in every war in which naval powers have participated. What, for instance, but her seacoast fortifications, protected the ports of France during the long-continued preponderance of English naval power, and permitted to grow up within them the successive fleets that ventured beyond the protection of those fortifications only to be destroyed?

While we find in this view of the subject such good general grounds of confidence in a well-devised system of seacoast fortifications, the operations of the season afford other very striking facts that it becomes us not only to keep in our memories, but to cause to enter into our calculations. These are, first, the large and powerful fleets that have so suddenly, out of a condition of profound peace, been sent into distant seas, and without any effort that might not, it would seem, be made at any other time with equal facility and despatch; second, the large armies—not small expeditions such as we have heretofore seen, but armies of 30,000, 50,000, and 100,000 men—that, with like ease, apparently, and equal promptitude, with every appliance of efficiency, and every provision for support, are landed upon very distant shores.

Duly considered, these are results of great moment to us. Fortunately, several of our most valuable places, that are accessible from the ocean, are within, or near to, populous districts; so that, if well protected on the water-side, their defences may be adequate, provided their strength on the land-side be sufficient to repel sudden and powerful assaults, and provided they can be maintained even for a short period against land operations. But there are other places, and some of great importance, that, for a considerable time—much longer than was required to reduce Bomersund—can have no other reliance than the fortifications and their actual garrisons.

We have, therefore, to protect our valuable points on the sea-board from powerful naval attacks. We are also liable to be suddenly assailed by a powerful combination of fleets and armies, and in certain situations are liable to *protracted* attacks of this nature. These are real dangers—they are formidable ones; but they can be resisted by well-known means if applied in time, and with a liberal hand.

Another instructive incident of the present war, as bearing upon the matters we are considering, may, for a moment, be referred to in the case of Petropolouski, a Russian port on the northwest coast of this continent. The complete defeat and discomfiture of the combined expedition against that place affords another proof, if another were wanted, of the reliance that may be placed on sea-coast fortifications. At the same time, it affords proof that even extreme remoteness, while it makes self-reliance the more indispensable to the defence, lessens in no degree the liability to naval attacks, nor does it diminish their power.

That our system of sea-coast fortification is a good and sufficient one, may be confidently asserted. It would be strange if it were not so, considering that we have full knowledge of all that has been done and is doing in that way by other nations; and that it has been the

subject of minute and careful examination of localities, and of long deliberation and study, by men educated for, and devoting to it all their faculties. I do not hesitate to insist that there is no system superior to it on any coast, either in general adaptation to its ends, in its details of design, or in its manner of execution. It has been reproached with being too comprehensive in its scope, and too large in some of its applications. On the first point enough has already been said for this report; and I only add, as to the second, that if such a reproach were ever justly chargeable against our system, (which I cannot admit,) there is now, at any rate, no unexecuted fortification to which, with any reason, such objections can apply. Indeed, if there be any particular danger as regards the manner of completing so much of the system as is still necessary for the protection of important places, it is, that in the desire to keep down the scale of our defences, we shall overlook the magnitude of the efforts that may be made against them. Against falling into this danger, however, it would seem that the great displays of military power made during the past season by nations always ready for war, and quite likely to be the first to test our strength, ought to warn and secure us.

All the fortifications included in the estimate of the year have been sanctioned by Congress, and are in the course of construction. Before proceeding to state briefly their condition, and that of other defences in charge of this department, I must ask the approval of Congress to some projects of fortifications not yet commenced, but necessary, at important places. *The first is at New Bedford*, the third city in the Union as regards registered tonnage, a place of great wealth, and with no other defences than an old and wholly inefficient six-gun battery. *The next is for Sandy Hook*, in order to command the lower bays, and render a close winter blockade of the city of New York impracticable. *The third is for Ship Island*, Mississippi, designed to cover the eastern approaches to the city of New Orleans, and also the coast of this part of the gulf, by protecting a most excellent anchorage for our commerce and cruisers. The fourth and last now proposed is *for a tower and battery at Proctor's Landing*, at the foot of Lake Borgne, whence a good road, wholly undefended, leads directly to New Orleans. All these have been before pressed upon attention, and supported with reasons at large.

The general subject of the defence of the Pacific coast has been steadily kept in view. But the information which it has been possible to acquire thus far, though valuable, is too general in its character to warrant the basing upon it a system of sea-coast defence. General reconnaissances of the coast by a joint commission of army and navy officers, and by an engineer officer, have been for some time in our possession. These leave no doubt of the importance of fortifying several positions indicated therein as rapidly as our means will allow. But there are a number of other points, in regard to which there is less certainty, and a particular survey of all such, as well as a careful examination of the intermediate coast, must be made before the relative importance of these positions can be fixed, or we can even be certain that there do not exist others of still greater value, and which

may render it unnecessary to provide any permanent defences for some of those now prominent.

For examinations and surveys of this character, we are almost entirely dependent upon the labors of the Coast Survey. Their general reconnaissance has now covered the whole Pacific coast from San Diego to the Straits of Fuca, and surveys preliminary to final careful triangulations have been executed in a number of cases. When a complete series of these, or even a general one, is in our possession, it will be practicable to discuss the subject, and present a systematic view of what shall be found to be necessary.

At present, San Francisco, the great centre of our interests on that coast, and occupying an undoubted pre-eminence in all respects, is being pressed forward to a condition of security as fast as the means allotted to it by Congress will admit. Should that body see fit to assign to it, at any time, a sufficient sum of money to complete the works now in progress, the energetic officers conducting them give every assurance that they will complete them within twelve months from the date of the appropriations. When these works are completed, the harbor of San Francisco will be in a respectable state of defence, although one other important work, to give a cross-fire at the entrance, and some minor defences, will still remain to be constructed.

Next in importance to San Francisco is the harbor of San Diego. Its geographical position at the southern limit of our line, its ample depth of water, freedom from shoals, spacious land-locked basin, fine and easily defended entrances, all combine to give it very high value. There is no question that these great advantages should be assured to our use, as well in war as in peace, and placed beyond the reach of an enemy at the earliest day.

Between San Diego and San Francisco other bays and harbors have been distinguished in the reconnaissances referred to above, as meriting early attention. Still our knowledge of this coast may be expected to be much increased, and the relative importance of the places themselves may vary before we shall be able to take up their defence.

Northward, from San Francisco, the mouth of the Columbia river at once strikes attention. This entrance to the great river of the Pacific, which sends its branches in so many directions through an extensive country, must become the outlet for a vast and valuable commerce. Its timber and agricultural productions already contribute largely to supply the wants of the adjacent shores. The fortification of this entrance is presented by the joint commission mentioned above, as demanding speedy attention.

At the northern extremity of our Pacific possessions we have the Straits of Fuca, bordering them, and the large expanse of navigable waters connected with these straits. The entrance to the Columbia is difficult and dangerous, but the passage through these straits and the access to several fine harbors within them, as well as the navigation of Puget's sound, Admiralty inlet, and Hood's canal, by vessels of all draughts, is without difficulty. The examination of these waters is in progress by the Coast Survey, several harbors both within and without the straits having been partially surveyed; and others were examined by the joint commission in 1850; but the country is new and unsettled,

and the interests to arise from the influx of population, and which will require time for their development, are as yet only nascent. Thus we cannot now combine a harbor of refuge with a place of supplies and refitment. Still, it is very important to secure to our exclusive use at the earliest day at least one harbor near our northern limits, where our ships can find shelter from storms, and, if need be, from the pursuit of an enemy. So long as we hold San Francisco the control of our Pacific possessions cannot be wrested from us; but to afford the most moderate convenience to our shipping in time of peace, and a reasonable prospect of security in war, a post in addition, near each extremity of our coast, must be fortified. There is no difficulty in deciding upon San Diego as the southern post for this purpose; but it is not easy, with our present partial information, to select the best similar northern position. The joint commission recommended the following northern harbors and bays to be minutely surveyed, with a view to comparison and selection, placing the surveys in order of importance as they here follow, viz: mouth of Columbia river, Shoalwater bay, Scarborough harbor; Ports Lawrence, Townsend, Discovery; Protection Island, narrows of Puget's Sound; entrance of Hood's canal, Grey's harbor, mouth of Chickales river. Some of these points have been examined by the Coast Survey, but their relative value as here stated is already changed, and other positions, claiming prior attention, have presented themselves to notice.

A short statement of the present condition of the several fortifications will be given under the head of each.

Fort Mackinac, Michigan.—No work has ever been done by this department upon this old fort, but it is necessary to make some repairs, as has been urged by the officer in command, and reported by the engineer officer sent to examine.

Fort Wayne, Detroit, Michigan.—The fort is ready for the armament. Some of the wood and metal work is in need of paint. The barracks should be finished, and a fire-proof storehouse and officers' quarters erected.

Fort Porter, near Buffalo, New York.—This fort is in condition to receive its armament. No appropriation is asked.

Fort Niagara, New York.—This fort needs some repairs, and there is a great want of accommodation for troops and of store-room and hospital-room.

For such objects an estimate is made for $6,000 in addition to the $3,000 appropriated last year.

Balance in treasury October 1, 1854	$3,000 00
Probable amount to be expended by 30th June, 1855	3,000 00
Estimate of amount required to be appropriated for fiscal year ending 30th June, 1856	6,000 00

Fort Ontario, Oswego, New York.——This work needs repairs, and some expenditures are called for on the buildings.

Fort Montgomery, Rouse's Point, New York.—The condition of the work is unchanged since last year's report. An officer has been assigned to it lately, who will prepare for applying the recent appropriation as soon as the opening of spring will allow of operations in the high latitude of the fort. This is the most important defensive work on the northern frontier, and its completion should not be delayed.

Balance in treasury October 1, 1854	$14,700 80
Probable amount to be expended by 30th June, 1855	14,700 80
Estimate of amount required to be appropriated for the fiscal year ending 30th June, 1856	15,000 00

Fort Knox, Narrows of the Penobscot, Maine.—The traverse of battery B has been finished, and that of battery A nearly so. The scarp of the main work is raised to the average height of 2½ courses of 2 feet thickness, and the counter-scarp to the height of two courses. The work done during the year is as follows: 2,328 cubic yards dressed stone, laid in mortar; 800 cubic yards dry stone backing; 366 cubic yards brick masonry, in arches and galleries; 150 cubic yards beton, in foundations and covering arches; 450 cubic yards rock excavations; 9,100 cubic yards earth embankment, west glacis; 167 square yards asphaltic mastic, covering roof of batteries.

The coming year it is proposed to continue the construction of the scarp and counter-scarp walls of the main work, the counter-scarp of the galleries, and the construction and covering of the casemates.

Balance in treasury October 1, 1854	$16,000 00
Probable amount to be expended by 30th June, 1855	16,000 00
Estimate of amount required to be appropriated for fiscal year ending 30th June, 1856	60,000 00

Fort Preble, Portland harbor, Maine.—The old sea-wall, destroyed by a gale, should be rebuilt without delay in a permanent manner. Repairs are needed on the barracks and quarters, and it is important that the site be extended by the purchase of neighboring land.

Balance in treasury October 1, 1854	$1,000 00
Probable amount to be expended by 30th June, 1855	1,000 00

Fort Scammel, Portland harbor, Maine.—This work is in charge of a fort-keeper. A future appropriation will be necessary for this fort, but none is asked for at present.

Fort Constitution, Portsmouth harbor, New Hampshire.—No expenditures have been incurred during the year. Some repairs of buildings are necessary.

Fort McClary, Portsmouth harbor, New Hampshire.—Nothing has been done during the year. No appropriation is asked.

Fort Winthrop, Boston harbor, Massachusetts.—The excavations for the tower have been carried to the depth of the bottom of the ditch;

about 7,500 cubic yards of earth have been removed and applied to the embankment of the south glacis, and to filling up ponds adjacent to the work.

During the next year the excavations for the foundations will be finished, and the masonry of the scarp and piers advanced as much as possible. No appropriation is asked at present.

Balance in treasury October 1, 1854 ..... $25,573 00
Probable amount to be expended by June 30, 1855..... 25,573 00

Fort Independence, Boston harbor, Massachusetts.—The appropriation recently made for this work will be applied the coming spring.

Fort Warren, Boston harbor, Massachusetts.—The most important items of work done during the year are as follows: Three cisterns, holding about 20,000 gallons, built; 1,540 linear feet of breast-height wall, on fronts 3, 4, 5, of main work; 33 pintle-blocks put in place on front 3, and the shoulder angles of 4 and 5; ten rooms for soldiers, and one suite for officers in the casemates, have been got ready for plastering; two other suites, and ten large rooms, have been more or less advanced towards completion.

Next year it is proposed to put up the breast-height wall on No. 2, to complete the arrangements for mounting all the guns, both in the fort and in the exterior batteries, and to finish, as far as practicable, the various other operations in progress. No appropriation is asked.

Balance in treasury October 1, 1854..... $49,000 00
Probable amount to be expended by June 30, 1855..... 49,000 00

Protection of the site of Fort Warren, Boston harbor, Massachusetts.—The old sea-wall built nearly thirty years ago having been poorly constructed, needs to be repaired, carried up higher, and partly rebuilt, or replaced by a new wall.

Estimate of amount required to be expended for the fiscal year ending June 30, 1856 ..... $10,000 00

Fort Adams, Newport harbor, Rhode Island.—Nothing has been done during the past year except placing 76 substantial wooden shutters in the embrasures, to secure the casemates against access from without, and to keep out the rain and snow.

With the recent appropriation small operations in the way of completion and preservation will be applied to various parts of the fort, and to the redoubt and wharf, and progress made in permanent exterior quarters.

Balance in treasury October 1, 1854..... $19,803 18
Probable amount to be expended by June 30, 1855..... 19,803 18

Fort Griswold, New London harbor, Connecticut.—Nothing has been done beyond keeping the work in order. The small balance in hand will be applied to repairing the fences around the public domain. No appropriation is asked.

Fort Trumbull, New London harbor, Connecticut.—The outer gate and port-cullis have been put up; the work is entirely finished, and in perfect order for occupation and service. The small balance in hand will be applied to building a fence around the public land, repairing roads, and paying fort-keeper's wages. No appropriation is asked.

Fort Schuyler, East river, New York.—A small amount of work has been done during the year, consisting of repairs to the sea-wall, rendered necessary by a very severe storm in April last. This wall was further injured by a severe storm and high tide which occurred in September. Such injuries render it very desirable that the wall should be completed as soon as possible. To effect this, and to complete some portions of the fort, an appropriation is asked.

Balance in treasury October 1, 1854	$14,000 00
Probable amount to be expended by June 30, 1855	14,000 00
Estimate of amount required to be appropriated for fiscal year ending June 30, 1856	25,000 00

Fort Wood, and sea-wall on Bedlow's island, New York harbor.—A fort-keeper only has been retained for the preservation of the property at this post. The works have been suspended since May, 1852, much to their injury.

Fort Richmond, Staten Island, New York harbor.—The construction of this important work has been suspended, for want of funds, since October, 1852. Under the appropriation made in August last, the tools and machinery have been put in order and partly renewed, stock purchased, the coping of curtain of the land-front cut, the excavation of the counterscarp of the land-front opened, the foundations laid, and part of the superstructure built. The coping of the curtain will be laid this fall.

Balance in treasury October 1, 1854	$55,000 00
Probable amount to be expended by June 30, 1855	55,000 00
Estimate of amount required to be appropriated for the fiscal year ending June 30, 1856	75,000 00

Battery Hudson, Staten Island, New York harbor.—Opportunity has been taken this season to construct a magazine for this water battery. The excavations, foundations, and part of the walls have been made, and the work will probably be finished this fall. Another magazine is needed, for which an appropriation is asked.

Estimate of amount required to be appropriated for the fiscal year ending June 30, 1856	$5,000 00

It is of great importance to secure the rear of this and the other works on Staten Island, for which end the United States should be the owners of a controlling position on the high ground behind. This object has been in view for many years, and an opportunity now offers to purchase the necessary land. The price asked is considered reason-

able, while the land is rising in value all the time. An appropriation is therefore now asked for the purpose.

Estimate of amount required to be appropriated for the fiscal year ending June 30, 1856 ..... $42,300 00

Fort Hamilton, New York harbor.—Two cisterns have been constructed in the terreplein of this work; the exterior slope of parapet of land-fronts repaired, as also the slope above the sea-wall on the river. The recent appropriations will be applied to construction of the necessary permanent wharf, and to the most indispensable repairs of the buildings. The rise in prices, since the estimate was prepared on which these appropriations are based, will make a small additional grant necessary.

Balance in treasury 1st October, 1854 ..... $10,000 00
Probable amount to be expended by 30th June, 1855 .... 10,000 00

Fort Lafayette, New York harbor.—Nothing has been done at this work during the year. The roof over the barbette battery will soon need repairs, as also the roof of the piazza.

No appropriation is asked at present.

Governor's island, New York harbor.—Considerable repairs of buildings and increased accommodations are needed for the troops, for which purpose an estimate is submitted.

Estimate of amount required to be appropriated for the fiscal year ending 30th June, 1856 ..... $26,500 00

Fort Mifflin, Delaware river.—The recent small appropriation is in course of application to indispensable repairs of the fort and its site; but, being only half the amount asked, it is not sufficient even for these.

Fort Delaware, Delaware river.—Four courses of cut-stone masonry have been laid on the grillage of this work since last year's report, bringing the general level up from reference (0′) to reference (7′ 5″,) and portions of two other courses, reaching up to (9′ 11″,) beyond which t is not proposed to go this season. The cistern arches are all turned on fronts 1, 2, and 3, and the middle arch on front 4. A large sewer for the drainage of the fort and parade has been introduced in the curtain of front 3. The entire wall was levelled off at the height (6′,) and the work laid off anew with great accuracy. Stone enough is on hand cut to carry the walls up to (12′ 6″.) The work is now in a condition to be pushed on with vigor, and an appropriation of $200,000 is asked by the officer in charge, which might be extended to $250,000, and even $300,000, with ultimate economy, as well as the advantage of materially hastening the period of efficiency.

Balance in treasury October 1, 1854 ..... $65,000 00
Probable amount to be expended by 30th June, 1855 .... 65,000 00
Estimate of amount required to be appropriated for fiscal year ending 30th June, 1856 ..... 150,000 00

Fort Carroll, Sollers, Point flats, Baltimore harbor.—All the piles for the foundation of the sea-wall have been driven, and all the sheet-piles, except about 150, on front 5. The levelling course of the sea-wall of front 2, the sea-wall of front 3, and that of front 4 nearly, have been finished. The angle of fronts 4 and 5 has been turned. The sea-walls of fronts 1, 2, 3, and three sections of front 4, have been filled with concrete. The year's work includes 370 foundations, and 855 sheet-piles driven; 512 pieces of cut granite laid in the sea-wall by the diving-bell, besides 327 pieces disturbed by a storm, and relaid, and 340 feet of stone apron placed at the foot of the sea-wall. The next year it is proposed to make progress with the fort proper, including filling the parade with earth. The temporary wharves required in the construction of this work, being of perishable materials, are fast going to decay. It is necessary, in addition to the great importance of the fort itself, that work on it be pushed forward, in order to avoid the large expense of renewing these wharves.

Balance in the treasury 1st October, 1854	$48,001 58
Probable amount to be expended by 30th June, 1855	48,001 58
Estimate of amount required to be appropriated for the fiscal year ending 30th June, 1856	100,000 00

Fort Madison, Annapolis harbor, Maryland.—Operations have been suspended since 1846, there not being an officer available for the work. The work heretofore done includes the excavation of the ditch of front 2, and part of front 3, a portion of the breast-height wall built, three pintle-blocks and traverse-circles set, and the blocks and iron rails on hand for the remainder. A wharf was built, which needs some repairs. It is designed to complete the battery the next season ready for the armament, and put up a shot furnace. An interior tower or keep is to be provided afterwards.

Balance in treasury October 1, 1854	$3,760 20
Probable amount to be expended by 30th June, 1855	3,760 20
Estimate of amount required to be appropriated for the fiscal year ending 30th June, 1856	10,600 00

Fort Washington, Potomac river, Maryland.—This fort is in an efficient condition; some repairs, however, are necessary to quarters and barracks.

Fort Monroe, Old Point Comfort, Virginia.—This fort is in the same condition as last year. The appropriation recently made will be applied to the completion of the magazines on front No. 6, and to such minor repairs as there may afterwards remain means to effect. For the prosecution of operations on the redoubt an appropriation is asked.

The grant for repair of the wharf will be applied to strengthening and rebuilding that structure, in such a way that steamboats and other vessels may be able to use it, and with a view to permanence.

Balance in treasury October 1, 1854	$20,000 00
Probable amount to be expended by 30th June, 1855	20,000 00
Estimate of amount required to be appropriated for the fiscal year ending 30th June, 1856	55,000 00

Fort Calhoun, Hampton Roads, Virginia.—It is designed to resume work, so long suspended on this important defence of Hampton Roads, as the subsidence, which has been very slight for some years past, is believed to have now ceased. The first step will be to remove the heavy load which was placed on the masonry in 1835. When this has been done, the work of construction can go rapidly forward.

Balance in treasury October 1, 1854	$18,596 00
Probable amount to be expended by 30th June, 1855	18,596 00
Estimate of amount required to be appropriated for the fiscal year ending 30th June, 1856	20,000 00

Fort Macon and preservation of its site, Beaufort harbor, North Carolina.—The appropriation for repairs will be applied to restoring the level of the parapet where it is deficient, substituting brass for the decayed iron-work of doors and windows of casemates, putting in glass, repairs of floors, repairs of fence at foot of glacis, repairing wire railing of steps from parade to terreplein, stopping one or two leaks in arches, cleansing ditch, and fitting two casemates as ordnance store-rooms.

The appropriation for the site will be used to prolong inshore, and raise the two jettees nearest the point. They are now in danger of being turned by the sea.

Balance in treasury October 1, 1854	$1,000 00
Probable amount to be expended by 30th June, 1855	1,000 00

Fort Caswell and preservation of its site, Smithville, North Carolina.—Various repairs are needed by the scarp and slopes of the batteries, and by the roof and floors of the citadel. The site also requires attention.

Fort Moultrie, and protection of its site, Charleston harbor, South Carolina.—The appropriation lately granted will be applied to securing the site from injury by the sea. The parade needs grading and draining for the health of the garrison, and two additional cisterns should be built to supply water for the troops. For these purposes a small appropriation is asked.

Estimate of amount required to be appropriated for the fiscal year ending June 30, 1856	$1,300 00

Fort Sumter, Charleston harbor, South Carolina.—The labor upon this work has been regularly prosecuted, adding much to its capacity for defence. The operations of the year comprise the following objects: the construction of the covering arches of the casemates along the east, northeast, and north fronts; roofing the arches of the east and northeast fronts with concrete, and raising the parade wall in their front; the stairway piers raised to their full height, except the one at the west end of the gorge, which is eight feet above the parade; the piles for the foundations of the officers' quarters have been driven, cut off, and capped with grillages, on which the concrete foundation of the walls has been placed; the casemates of the east half of the gorge have

been studded and lathed, and considerable materials are collected for the further prosecution of the work.

The work remaining to be done is to turn the remainder of the covering arches, and all the second tin floor arches, complete the concrete roofing of the covering arches, put on the earth-filling to form the terreplein, raise the parapet wall, lay the pintle-blocks and traverse-circles, put in the embrasures of the second tier, establish the foundations of the west barrack, build this barrack and the officers' quarters, construct a building for officers' storerooms, &c., complete the system of drainage and cisterns, and the various details belonging to the completion of the defences and the accommodation of the garrison.

Balance in treasury October 1, 1854	$74,000 00
Probable amount to be expended by June 30, 1855	74,000 00
Estimate of amount required to be appropriated for the fiscal year ending June 30, 1856	80,000 00

Preservation of the site of Fort Johnson, and repair of the wharf, Charleston harbor, South Carolina.—The recent appropriation will be applied to the preservation of this important site, which controls the channel opposite Castle Pinckney. A recent storm of great severity did much injury to the works heretofore constructed at this point, and it is necessary to put them in good condition again, as well as to rebuild the wharf, which was carried away by the waves.

Balance in treasury October 1, 1854	$4,200 00
Probable amount to be expended by 30th June, 1855	4,200 00

Repairs of quarters and barracks at Fort Johnson, Charleston harbor, South Carolina.—These repairs, commenced some years since, should be completed. Being suspended in a half executed state, the work thus far done is of but partial use, and the buildings are suffering in consequence of their incomplete condition.

Repairs of Castle Pinckney, Charleston harbor, South Carolina.—The parade and site of this work are frequently overflowed; it is essential to the health of the garrison that the parade be kept dry. The sea-wall has been much damaged by the late severe gale, and requires to be repaired. Other minor repairs are also needed.

Fort Pulaski, Savannah river, Georgia.—The bad health of the officer in charge has prevented the resumption of operations at this work. As soon as the sickly season is passed work will be commenced. The gale of the 8th and 9th September was destructive at this position to the dikes, which were broken, and in some places swept away. The wharves were mostly carried away; the bridges carried off, as likewise the carpenter-shop, and several small buildings and fences.

Balance in treasury October 1, 1854	$19,000 00
Probable amount to be expended by June 30, 1855	19,000 00

Repairs of Fort Jackson, Savannah river, Georgia.—The work yet to be done comprises finishing counter-scarp and sub-scarp walls, com-

pleting scarp and wharf, making draw-bridge and machinery, embanking dikes, grading parade, arranging flank-guns, and construction of officers' and soldiers' quarters.

Balance in treasury October 1, 1854	$5,000 00
Probable amount to be expended by 30th June, 1855	5,000 00
Estimate of amount required to be appropriated for the fiscal year ending 30th June, 1856	20,000 00

Fort Clinch, Amelia island, mouth of Cumberland sound, Florida.—Want of funds prevented the resumption of operations during the last winter; the coming season it is proposed to apply the recent appropriation of $25,000 to the work. For the succeeding year a similar grant is asked.

Balance in treasury October 1, 1854	$25,001 71
Probable amount to be expended by 30th June, 1855	25,001 71
Estimate of amount required to be appropriated for the fiscal year ending 30th June, 1856	25,000 00

Fort McRee, Pensacola harbor, Florida.—The platforms supporting the second tier of guns of this work are reported to be decayed; there are also some leaks through casemated arches that require attention. Additional work is required upon the exterior battery. The further protection of the site from the action of the sea requires the construction of some permanent jettees.

Balance in treasury October 1, 1854	$10,000 00
Probable amount to be expended by June 30, 1855	10,000 00
Estimate of amount required to be appropriated for the fiscal year ending June 30, 1856	25,000 00

Fort Pickens, Pensacola harbor, Florida.—Nothing has been done during the past year. Slight repairs are needed in the way of cleaning water-pipes, pointing cracks, repairs of pavements, and closing breaks in asphalt of terreplein, &c.

Fort Barrancas and barracks thereat, Pensacola harbor, Florida.—The work is in the same condition as last year. The most pressing objects now is the construction of the advanced redoubt, for which, and some minor matters, and for progress on buildings for the accommodation of troops, an estimate is submitted.

Balance in treasury October 1, 1854	$8,900 00
Amount to be expended by June 30, 1855	8,900 00
Estimate of amount required to be appropriated for the fiscal year ending June 30, 1856	30,000 00

Fort Morgan, Mobile Point, Alabama.—For want of an appropriation the operations of the last year have been limited to restoring and grassing the parapet where gullied by rain-storms, and some slight temporary repairs of the slating and leading of the roofs, which had been injured by the hurricane of 1852.

The recent appropriation will be applied the coming season to the most indispensable repairs, as follows: the ridges and valleys of part

of the citadel roof will be relaid, in order to obtain dry store-rooms for the ordnance, tools, &c., now stored in the building; the north magazine leaks and its roof must be repaired; the fenders of the wharf have been carried away by steamboats, thus exposing the stone piers of the wharf to overthrow: they will be renewed by logs of large size; the quarters, kitchen, and office to be repaired, including repairs of slating, leading gutters, conductors, doors, windows, hangings, fastenings, plastering, repainting, and repairs of pavements. The fencing must be restored to keep off cattle.

Fort Gaines, Dauphin island, Mobile, Alabama.—The title to this site being now perfected, and jurisdiction over it being vested in the United States, it is proposed to commence work with the small balance now in hand, the coming season, on this fort, which commands the western entrance into Mobile bay. For continuing the operations the next year an appropriation is asked.

Balance in treasury October 1, 1854	$13,000 00
Amount to be expended by 30th June, 1855	13,000 00
Estimate of amount required to be appropriated for the fiscal year ending 30th June, 1856	50,000 00

Fort Pike, Rigolets, Louisiana.—Some slight repairs have been executed during the past year to this fort, which is in charge of the Quartermaster's department. The recent small appropriation will be applied to the most urgent repairs, but it will not suffice to do all that is needed.

Balance in treasury October 1, 1854	$1,000 00
Probable amount to be expended by 30th June, 1855	1,000 00

Fort Macomb, Chef Menteur, Louisiana.—The appropriation in hand will be applied to the most urgent repairs; among which are, rebuilding the draw-bridge, repairing its pier, repairs of breast-height slope, of sustaining-walls of banquetts and traverses, and leaks in the casemates. The bayou is eating into the ground in front of the fort—a tendency which should be arrested, and for which the means in hand will not suffice.

Balance in treasury October 1, 1854	$2,000 60
Probable amount to be expended by June 30, 1855	2,000 00
Estimate of amount required to be appropriated for the fiscal year ending June 30, 1856	9,500 00

Battery Bienvenue, Bayou Bienvenue, Louisiana.—Much of the woodwork of this fort needs repairing. The posts of the stockade, the breast-height, and the wooden platforms, are all injured by decay.

Tower Dupre, Bayou Dupre, Louisiana.—The slopes of this work and its levee, the tower-ditch, the stockade, and breast-height, need repair.

Fort Jackson, Mississippi river, Louisiana.—Nothing has been done since 1851 for want of funds. Next year it is proposed to complete

the exterior water-battery, including breast-height walls, magazine, pintle-blocks, and traverse-circles, and to raise and enlarge the citadel, so that it will afford accommodation for the garrison of the work. A small draining-machine is thought to be necessary at this position, by the local engineer, for the comfort and health of the garrison. The levee around the work needs repairs, and in some places reconstruction.

Estimate of amount required to be appropriated for the fiscal year ending June 30, 1856..... $10,000 00

Fort St. Philips Mississippi river, Louisiana.—Work here has been suspended for some time for want of means. The late appropriation will be applied, during the approaching season, to the following objects: completing the facing of the scarp on the land-side on faces 3, 4, 5, 6, 7, 8, to the top of the coping; building up the scarp on the water-front on faces 9, 10, 11, 12, 13, 14, to the same height; rebuilding the breast-height walls of the upper exterior battery, and relevelling its parapet; rebuilding the relieving-arches of the new scarps, putting on the parapet, and constructing the breast-heights.

Next year it is proposed to complete the parade-walls, set the pintle-blocks and traverse-circles of the barbette guns, and grade the parade.

Balance in the treasury October 1, 1854.....	$24,751 85
Probable amount to be expended by June 30, 1855.....	24,751 85
Estimate of amount required to be appropriated for the fiscal year ending June 30, 1856.....	35,000 00

Fort Livingston, Grand Terre island, Louisiana.—There is still a little settlement at this fort, though very slight; the work can remain in its present condition until the subsidence is over. A violent storm visited the locality in August last, and nearly destroyed the jettees recently built for the protection of the site. Their effect had previously been very satisfactory. They are to be rebuilt, with loading of more ponderous masses, such as is thought will resist the force of the waves.

Balance in treasury October 1, 1854.....	$3,825 42
Probable amount to be expended by 30th June, 1855.....	3,825 42

Fort Taylor, Key West, Florida.—The work of the year includes laying grillages for piers and cisterns on all the fronts; constructing piers for casemates and cistern-arches on shore-front and in each of the bastions; completing main drains under southwest and northwest bastions; excavations for grillages, and foundations and embanking around them; collecting and breaking the island stone for concrete; extending wharf and strengthening bridge; removing part of old breakwater for grillage; timber, and constructing a new smithery. The masonry executed amounts to 834 cubic yards island stone, 39½ cubic yards granite, 327 cubic yards brick, and 1,300 cubic yards concrete. 12,658 cubic yards of sand have been excavated and embanked; 3,100 cubic yards stone broken for concrete; 94 running feet added to the wharf, and 81 piles driven.

The funds available will be applied to completion of grillage-work and cistern-floors, raising piers of casemates and cistern-arches to at least the present height of scarp, continuation of scarp-wall, and provision of materials. The difficulties attendant upon submarine work are now all past as to the main body of this fort. The future operations thereon, so important to the commerce of the South and West, will be limited only by the extent of the appropriations which Congress may make. Should the next year's grant be liberal, it will suffice to enable the engineer to get ready for two tiers of guns.

Balance in treasury October 1, 1854	$97,167 04
Probable amount to be expended by June 30, 1855	97,167 04
Estimate of amount required to be appropriated for the fiscal year ending June 30, 1856	150,000 00

Fort Jefferson, Garden Key, Tortugas island, Florida.—The operations of the last year embrace laying foundations, and raising scarp to low-water level on parts 2, 3, 4, and 5, with the construction of the coffer-dams belonging thereto; building two large cisterns; embanking the parade of the work; collecting and boating coral for concrete, and sand for masonry; working up a permanent quarters, and arranging for future supplies of materials.

The amount of work done during the year is 141 cubic yards of brick, and 2,807 of concrete masonry; 19,937 of sand embanked in parade; 4,148 yards of coral boated for concrete; 1,754 of sand boated for masonry; 2,616 piles driven in coffer-dam; 46 pairs of blinds made for windows of quarters.

It is expected that the funds now available will enable the whole of the masonry to be brought up to low-water mark; the work can then go on with great rapidity, and may, with a liberal grant from Congress for the next year, be got ready, by its termination, for all the guns of the lower tier.

Balance in treasury October 1, 1854	$85,000 00
Probable amount to be expended by June 30, 1855	85,000 00
Estimate of amount required to be appropriated for the fiscal year ending June 30, 1856	150,000 00

Forts on the western frontier of Texas.—The officer engaged in the examination of this frontier for defensive purposes, has selected several positions proper to be occupied by works. One site has been fortified; work at other points will be proceeded with, as soon as lands can be purchased and titles obtained. To provide storage for artillery, ordnance, commissariat, medical, and engineer departments at those works, an additional grant will be needed.

Balance in treasury October 1, 1854	$100,000 00
Probable amount to be expended by June 30, 1855	100,000 00
Estimate of amount required to be appropriated for the fiscal year ending June 30, 1856	50,000 00

Fortifications on Alcatraz island, San Francisco bay.—During the year ending September 30, 1854, all the temporary buildings have

been erected that will probably be needed in the construction of the fortifications on Alcatraz island. These include storehouses, workshops, stable, barracks, mess-house, and office. The requisite tools, implements, and machinery, have been purchased or constructed. Two wharves have been built for receiving materials, and roads of communication excavated to the localities of the different batteries. The excavation for the north and south batteries, and their flanking capponiers, are essentially finished, being made mostly in partially decomposed rocks. The scarp-wall of the left branch south battery has been raised to the coping, and the foundations prepared for its breast-height wall. The capponier on this side is not quite half finished. A portion of the concrete foundation of the scarp of the north battery has been laid.

Ten guns have been mounted in temporary batteries on the island.

The work executed includes 1,650 cubic yards of masonry; 12,200 excavation, mostly in rock; 1,179 embankment.

Balance in treasury October 1, 1854	$80,000 00
Probable amount to be expended by June 30, 1855	80,000 00
Estimate of amount required to be appropriated for the fiscal year ending June 30, 1856	200,000 00

Fortifications on Fort Point, entrance to San Francisco bay.—The operations for the year have consisted in constructing quarters, mess-houses, &c., for a force of 300 mechanics and laborers, with workshops, storehouses, and stables; building an extensive wharf; making a plank road thence to the site of the fort, 2,100 feet; excavating 150,000 cubic yards of rock from the point, to prepare the site of the fort; purchasing and constructing machinery, tools, and implements for raising stone; mortar-making, transporting materials, &c. These preparatory operations are now very nearly completed, so that the whole of the appropriation for the current year will be applied in a few months to the masonry of the water-fronts. A much larger sum could be expended, were it available. No considerable progress towards efficiency can be made with the limited means provided.

It is believed by the officer in charge, after a year's experience and study of this work, that the fort can be finished in another fiscal year, if the means be provided by Congress. To this end, the appropriation of $650,000 would be required.

Balance in treasury October 1, 1854	$95,000 00
Probable amount to be expended by June 30, 1855	95,000 00
Estimate of amount required to be appropriated for the fiscal year ending June 30, 1856	300,000 00

In my last annual report I urged the necessity of an increase of the corps of engineers, in order to afford the number of officers indispensable to the execution in a proper and economical manner of the duties belonging to the corps. That report contains some general remarks touching that necessity. I propose now to demonstrate the present deficiency by a statement specifying the officers now employed, and those needed in the several operations and duties under this department.

A similar statement was communicated, with your approbation, to

the military committees of the two houses of Congress at the late session.

I propose also to explain that any augmentation should be gradual and by additions to the foot of the corps, and to give, moreover, the exact expense of the proposed increase.

Here follows a statement of the fortifications and employments now in hand, *exclusive of river and harbor works, light-house inspectorships, light-house constructions and repairs, custom-houses, marine hospitals*, and other works of civil engineering assigned to the corps of engineers, some by law and some by regulation, requiring the presence and services of engineer officers, and showing the number of such officers now engaged therein, and also the number indispensable to a due execution and control of the operations—all the expenditures on the same being made by those officers.

Designation of fortifications and employments.	Engineer officers now present.	Engineer officers now wanted.
At Fort Knox, on the Penobscot river, Maine	1	1
At Fort Preble and Fort Scammel, Portland harbor, Maine; and at Fort Constitution and Fort McClary, Portsmouth harbor, New Hampshire	.....	1
At Fort Warren, and sea-walls of Lovell's island and Deer island, Boston harbor, Massachusetts	2	
At sea-wall of the Great Brewster island, Boston harbor, Massachusetts	.....	1
At Fort Independence, Boston harbor, Massachusetts	.....	1
At Fort Winthrop, Boston harbor, Massachusetts	1	
At Fort Adams, Newport harbor, Rhode Island	.....	1
At Fort Schuyler, New York harbor	1	
At Fort Wood and Governor's island, New York harbor	.....	1
At Fort Richmond and Batteries Hudson and Morton, Staten island, New York harbor	1	
At Fort Hamilton and Fort Lafayette, Long Island narrows, New York harbor	.....	1
At engineer agency, for general engineer service, purchasing supplies, &c., New York	1	
At Fort Delaware, Delaware river, Delaware, and Fort Mifflin, Delaware river, Pennsylvania	2	
At Fort Carroll, Sollers's Point flats, Patapsco river, Maryland	2	
At Fort Madison, Annapolis harbor, Maryland	1	
At Fort Monroe, Hampton Roads, Virginia	1	
At Fort Calhoun, Hampton Roads, Virginia	.....	1
At Fort Macon, Beaufort harbor, and Fort Caswell, mouth of Cape Fear river, North Carolina	1	
At Fort Sumter and Castle Pinckney, Charleston harbor, South Carolina	2	
At Fort Pulaski and Fort Jackson, Savannah river, Georgia	1	1
At Fort Clinch, Cumberland sound, and Fort Marion and sea-wall, St. Augustine, Florida	1	
At Fort Taylor, Key West, Florida	1	1
At Fort Jefferson, Garden Key, Tortugas, Florida	1	1
At Fort Pickens and Fort McRea, and at Fort Barrancas and barracks thereat, Pensacola harbor, Florida	1	
At Fort Morgan, Mobile Point, Alabama	1	
At Fort Gaines, Dauphin island, Alabama	.....	1
At Fort Wood and Fort Pike, and Battery Bienvenue and Tower Dupre, at the eastern approaches to New Orleans, Louisiana	1	
At Fort Jackson, Mississippi river, below New Orleans, Louisiana	1	
At Fort St Philip, Mississippi river, below New Orleans, and Fort Livingston, Barrataria bay, Louisiana	1	

Designation of fortifications and employments.	Engineer officers now present.	Engineer officers now wanted.
At Fort Wayne, near Detroit, Michigan	.....	1
At Fort Porter, at Black Rock, Lake Erie, and Fort Niagara and Fort Ontario, Lake Ontario	.....	1
At Fort Montgomery, outlet to Lake Champlain	1	
In the Engineer department	2	2
On the Board of Engineers for the Atlantic coast	.....	2
On the Board of Engineers for fortifications, Pacific coast	.....	2
On forts, entrance to San Francisco harbor, California	5	1
On the Pacific frontier on general military duty	.....	1
On the Texas frontier.....do	.....	2
At West Point, superintendent 1; engaged in instruction 2; in company of sappers and miners 4	7	2
On the Coast Survey	3	1
Directing the works on the Military Asylum and Smithsonian building	1	
Superintending construction of buildings under Treasury Department	1	
Exploring the northern route for railroad to Pacific	2	
	47	28

In the above statement, the number of officers requisite for a proper execution of the duties confided to this branch of the military service placed at an absolute minimum. A less number at any of the forts or places must result in positive injury to the public interests, greater or less.

In relation to the above enumerated deficiencies, I could adduce striking particulars by way of showing the disadvantages, and even pecuniary losses, that unavoidably ensue from the want of an ever-present official supervision. In every instance in which additional officers are called for in the preceding table, I could, if it were not for too much lengthening these remarks, give conclusive reasons for such a call, connected with the *economical* as well as the *proper* execution of the works. The table, though liable to some modifications from year to year, gives a just average of the distribution of officers.

In this statement none of the present employments of the officers on works of river and harbor improvement are specified, although there are more than thirty such works in their charge, because it might be alleged that those are temporary, being liable to be arrested by a suspension of appropriation for such objects. And no mention is made of various other duties that officers of engineers are now performing, in addition to those connected with fortifications, the Military Academy, &c., unless they exclusively occupy the attention of the officer. For instance, three are now employed, under provision of law, as inspectors of light-houses; five in their construction or repairs; one is engaged on the extension of the Capitol, and introduction of water into Washington city and Georgetown; three are superintending construction of cus-

tom houses, &c.; these duties being in addition to their charge of fortifications and military works.

It is seen above, that there is, at this time a deficiency of 28 officers, independent of all duties upon the thirty or more harbor and river, and various other civil works. I see no reason to suppose that this deficiency can be lessened in future by any diminished demand for the services of the officers of the corps. On the contrary, the urgent calls for their services, on governmental constructions, including light-houses, custom-houses, or military asylums, navy yards, &c., all entirely independent of the system of fortifications, and the Military Academy, and company of sappers and miners; the unavoidable extension of the fortifications of the coasts, by the acquirement of Texas, and California, and Oregon; the necessity in time of war, or on its approach, of attaching to every army in the field a number of experienced engineer officers, &c., &c., show, without going into other considerations that might be forcibly presented, that the deficiency, instead of being temporary, is very certain to grow with years.

The probabilities of mistakes, of a languid or negligent execution of, and inattention to, the public interests during the absence, for the greater part of the time, of the only responsible person; the considerable expense of frequent journeys by the officers, and especially in the hire of persons to supply, as well as may be, the want of official supervision—these, and other like consequences, cannot but be inevitably connected with the present state of things.

And in the matter of mere expense, I risk nothing in asserting that the total cost to the country, of the increase herein proposed, will be less than the additional cost of the operations under this department, in extra transportation of supervising officers, in the hire of superintendents, draughtsmen, &c., &c., consequent, inevitably, heretofore, now, and in future, upon the want of an adequate number of officers of engineers.

But this want, real and pressing as it is, cannot be fully supplied in any sudden manner. If the engineer officer is wanted at all, it is because his education and his practical experience have prepared him for his peculiar functions—a preparation attested by the practice of all nations to be indispensable. And the only way for us to make sure that officers added to the corps shall possess the requisite qualifications for their growing responsibilities, will be to superadd, while they are upon the first step in rank, to the scientific elements which they bring from the Military Academy, the practical instruction only to be given by professional labors, and the future studies which these labors involve.

In countries having large wants of this nature, as well as large experience in all military matters—in France, for instance—provision is made, by a "school of application" for academical applications, during one or two years, of the scientific principles brought from the elementary school, (École Polytecnique) before attempting, on the ground, their practical use. We, having no such "school of application," and being obliged to study while we work, have so much the greater need of stepping slowly and cautiously into labors involving large expenditures and grave consequences.

The officers that we design to add to the corps of engineers must

therefore gain, in the lower grades and least responsible stations, as soon as possible, but still gradually, and step by step, the professional knowledge and experience indispensable in the higher duties that await them.

The scientific education acquired at our Military Academy, by the higher graduates, varies, somewhat, with the talent of the respective classes. But it may be assumed that on an average three or four such graduates each year may be relied on as qualified by acquirement, habits of application, and talents, to go into the practical "school of application" afforded by the professional operations of the corps of engineers.

Accordingly, any scheme of enlargement should contemplate the addition, during a term of years, of a number of second lieutenants, say three or four, on the average, per annum; with corresponding promotions within the whole corps, until the augmentation shall have reached its limit—all the additions being made at the foot of the corps, by such graduates of the Military Academy, *and such only*, as shall have been recommended for appointment into the corps by the Academic Board.

It may very naturally be asked how, with such a deficiency of officers, are the duties of the engineer department now carried on? The answer is this: by multiplying the responsibilities of each officer—calling on them for still greater efforts—at the same time supplying them, though at considerable expense, with the helps we can command. But, besides the cost of these additional employees, this must result, as said before, in positive injury, greater or less: that is to say, in the reliance we are forced to place in hired agents, often entirely without experience of the kind needed, and at best but partially competent, there never can be that care and success in the execution of work, and management of the public interests, that the presence of an engineer officer would secure.

This brings us to a word or two on the expense of the proposed augmentation.

There are now in the army five brevet 2d lieutenants, exclusive of those in corps of engineers—namely, five in topographical engineers, three in ordnance, two in rifles, seven in dragoons, five in artillery, and thirty-two in the infantry.

The class of graduates in June next will supply the additional number of thirty-six, so that, allowing for casualties, there will be, then, some fifty or sixty brevet 2d lieutenants in the army. And we know, by experience, that the academy has continued to supply an excess over all vacancies in the army.

The brevet appointments of officers, in addition to the organizations proper for the several regiments and corps, are expressly provided for by law.

Taking annually three or four of these brevet second lieutenants and attaching them to the corps of engineers, will not, in any sense, be adding that number of officers to the army. If not thus attached, they would be connected with some other corps or regiment, therein to do duty, while awaiting promotion; and as these three or four graduates are to have the recommendation of the Academic Board for this assign-

ment, they must be at or near the head of their respective classes, and, therefore would, if not added to the engineers, be attached to the topographical engineers, or to the ordnance, in both of which corps the allowances are the same as in the engineers, so that the proposed assignment would cause no additional cost whatever to the government.

It may therefore be asserted that the only additional expense would be in the difference of allowances within the corps, consequent upon promotion therein; what this will amount to in the end, of course, will depend on the extent to which the augmentation is to be carried; knowing this extent, and the annual rate at which the promotions are to be made, it will be easy to calculate the additional cost each year, and the total annual addition.

Assuming that each officer is to draw *everything* in the way of *pay, subsistance, forage, servants, fuel* and *quarters*, that is allowed by law or regulation—the fuel being calculated at five dollars per cord, and it being assumed that one half the officers are to be at stations and on duties, obliging them to hire private quarters, that being about the usual proportion of officers so situated—the cost of such quarters being taken moreover in all cases at the rates paid in this city, the increased allowances on promotion will be as follows:

Promotion of	second lieutenants to first lieutenants—no addition.		
Do	first lieutenants to captains..	$271 79	per annum.
Do	captains to majors.....	581 75	do
Do	majors to lieutenant-colonels..	222 00	do

Assuming now that, at the end of seven years, there shall have been added two lieutenant-colonels, four majors, twelve captains, and twelve lieutenants, making thirty in all, the total additional expense annually to the nation will be $6,092 48; but, within that period, the twelve captains will have been supplied under existing law, so that in fact the additional expense annually chargeable against this proposition will be only $2,831—resulting from the promotion of four captains ($2,327) and the promotion of two majors ($504.)

I have given no other details than those required to follow and test my calculation; but it must be here stated that it is only when the whole supposed addition shall have been made, that is to say, at the end of seven or eight years, when the whole thirty officers shall have been added, that the annual increase of cost will reach the sum of $2,831; it will be less than that for every preceding year, and afterwards no more than that.

Now, to say nothing of the injury to the public interests before mentioned, this sum does not compare with our actual outlays consequent upon the want of officers—in the hire of persons to take charge of engineer operations of various kinds, and as draughtsmen—in cost of extra traveling, &c., &c.; for instance, I have been obliged to keep draughtsmen employed in this office on works purely technical and appropriate to engineer officers, at an expense, for the year just elapsed, of $2,809 68; and there has been nothing peculiar in the demands of the year, nothing but what must be continued in future years, unless the number of officers is increased.

I say nothing of the propriety and justice of making corresponding promotion within the corps, beyond stating that all the present majors

have been such more than sixteen years; the oldest captain has held his present rank more than eighteen years, and the next seven captains have been such more than sixteen years.

I deem it quite important that the law providing for an increase should require that it be made by an average annual addition to the foot of the corps of (three or four) graduates for — years, specifying and restricting the augmentations for the several grades.

As the deficiency is severely felt at this moment, and can only be gradually supplied, it is very important that the increase should be commenced at the earliest day practicable.

On this subject I beg to refer to an able report, made by the Military Committee of the House in 1851—see report number twenty-nine, second session thirty-first Congress, and also to my annual report to the Secretary of War, November, 1850—see Executive Document, number one, page 342, second session thirty-first Congress.

In a conscientious discharge of duty, without any personal interest, present or prospective, in the matter, and in a way which seems to me to leave no room for cavil or objections, having shown the actual need of an increase, the proper mode of supplying the need, and the trivial expense to be incurred, I earnestly invoke the prompt support demanded for it by the public interest.

Here is the place for me to present the importance of an increase of the sapper, miner and pontonier force. The single company now authorized has rendered much valuable and efficient service during the past year and previously. But its numbers have proved too small to fulful the several purposes contemplated in its creation; indeed the calls upon it have been so numerous, that, as to some of these purposes, nothing could be done. So largely have detachments been made from the company for special purposes, that it has been possible to retain at West Point only a skeleton, so reduced as to suffice merely for the practical instruction of the cadets in siege and field operations. It has always been designed to station a few engineer soldiers at each fort under construction, and at our principal finished forts; their technical information, and their relation to the government, so different from that of the employés temporarily hired, give us confidence that by so doing, economy and efficiency in work in progress will be promoted; while the daily condition of finished works will be observed, the commencement of deteriorations prevented or arrested, and their minor details maintained in the best order for prompt use. But we find ourselves unable to make detachments for these purposes at present, and I therefore recommend that Congress be asked to grant, the approaching session, one company in addition to the existing one, and on the same organization.

MILITARY ACADEMY.

The customary annual report of the Board of Visitors for the last year is transmitted herewith. I need not say anything in addition to their testimony to the value to the country of this school of military instruction. I have not been able to visit the academy during the last year, but feel assured that the establishment continues to work harmoniously, successfully, and with constant progress, in effecting the objects for which it was instituted. The able and unremitting exertions of the superintendent and the academical and military staff of the academy are borne testimony to in the report of the Board of Visitors.

The extension of the course of studies from four to five years, urged for some years past by friends of the academy, has been determined on, and the class which entered in July was accordingly divided into a *fourth* and a *fifth* class. The academical arrangements and progress of the elder cadets will not be disturbed by the change, but all succeeding classes will pursue a five years' course of studies.

The advantages of the new system are many and manifest. While the general scientific course of studies is regarded as ample, and will not be further developed, other subjects have heretofore been imperfectly attended to for want of time. The philosophy of the English language, composition and elocution, are important parts of the education of an officer, to which heretofore very little attention could be given. Mental and moral philosophy, general and military law and evidences, and the study of the Spanish language, as well as the above, will now receive due attention; and military engineering, reconnoissances, artillery, the tactics of the special arms, and their subdivisions, will be pursued upon a more expanded scale, while, withal, the cadet will be somewhat relieved from the pressure of mental labor which has been gradually much increased.

The most important items of the estimate of the expenses of the military academy for the next fiscal year are as follows:

For current and ordinary expenses	$35,070 00
For increase and expense of the library	1,000 00
For board of visitors	4,160 00
For forage of artillery and cavalry horses	8,640 00
For replacing dead and worn-out horses	1,000 00
For repairs and additions to professors' quarters	5,000 00
For commencement of officers' quarters	20,000 00
For furnishing hospital cadets	500 00
	75,370 00

It will be noticed that separate from the items which contemplate the commencement of quarters for the officers on duty at the academy, and the refurnishing the cadets' hospital, the total of the above estimate is $54,870

On the subject of officers' quarters I desire to say a few words.

The importance of commencing quarters for the officers of the army stationed at the Military Academy has been heretofore urged by me, as well as by the annual Board of Visitors, including the board of the present year. The buildings appropriated to the staff of the academy are by no means adequate to the accommodation of the officers on duty with it. Most of these buildings are assigned to the heads of departments, and other gentlemen employed in the administration of the institution, from civil life. Only a portion of the army officers necessarily present, and occupied in the task of instruction, can be provided with quarters in the remainder of these houses; the others have for some time, of necessity, been occupying rooms in the cadets' barrack, a state of things objectionable on many accounts, as respects both officers and cadets.

Moreover the best interests of the academy demand that service at it should be made attractive to the army, so that competent and suitable officers may be led to accept, with willingness, the posts of instructors and other positions thereat. No inducement is of a more inviting character than sufficient and convenient quarters, especially if the officer have a family. As the case now is, many officers are obliged either to submit to the discomforts and annoyances of rooms in the cadets' barrack, or to board at the hotel, at prices entirely beyond the means supplied them by government. Consequently, service at the Military Academy, instead of being sought after, even by those young officers who desire to advance themselves in professional knowledge, (and who may therefore be presumed to be the most suitable as instructors for the cadets,) has come to be often very unacceptable, though not to be avoided.

On this subject I cannot do better than to present the language of the able officer now in charge of the academy. He says, "I think it would be to the interests of the academy that the duty should be made desirable, so as to secure the willing service of those most competent," &c., &c., &c. "To induce officers to study and prepare themselves for the position, some advantages and permanency ought to be secured to them, and quarters for a family is a great object."

I have to request, therefore, that application may be made to Congress at the approaching session for a grant of $20,000 *for commencement of officers quarters* at the Military Academy,

A small appropriation is also desired for *purchasing furniture for the cadets' hospital.* The present furniture is reported as being completely worn out, and unfit for use; $500 will suffice for this purpose.

I desire also to call your attention to a few other points. I regard it as important that a professorship of ethics be constituted, independent of the chaplaincy of the academy. The duties of such a professorship, much enlarged by the adoption of the five years' programme, and embracing instruction in English grammar, geography, history, composition and elocution, rhetoric, logic, moral and intellectual philosophy, international, constitutional and military law, rules of evidence and practice of courts martial, are varied and extensive enough to tax to the utmost any incumbent of the chair; while a chaplain who gives to his peculiar duties all the labor, time and attention that their due

discharge will exact, at a post so large and populous as West Point, cannot be expected to have any time at his command for other purposes; and if, from the necessity of the case, he must combine the duties of a professor with his clerical functions, one, if not both of his charges must suffer from unavoidable neglect.

It is also desirable that the instruction in artillery and cavalry should be conducted under separate heads. The two subjects have nothing in common, except that the practice of their tactical evolutions require horses in each case; but these can be so used, under a division of studies, as well as now. The manifest disadvantage of grouping together such incongruous pursuits should no longer continue.

The propriety of a small increase of accommodation in the building occupied by the professors has been acquiesced in by Congress, by an appropriation for the purpose; the sum granted, however, having proved inadequate to complete the designed improvements, an additional grant is asked this year.

The pay of the professors of French and drawing still continues to be less than that of their associates in the academic staff; this disparity, it is hoped, may be removed. The increased expense of living, and in the case of one of these professorships, the large accession of labors just determined on make this measure one of mere justice.

The explanation of the estimate by the superintendent, as well as of the detailed estimates of the several departments, which go to make up the above general statement, is appended to this report.

I now give a very interesting statement showing the condition in life of the cadets for the last thirteen years. It must be understood that this information is derived from the cadets themselves.

Statement exhibiting the condition in life of the cadets of the Military Academy, West Point, for the last thirteen years, from 1842 *to* 1854, *inclusive.*

	1842.	1843.	1844.	1845.	1846.	1847.	1848.	1849.	1850.	1851.	1852.	1853.	1854.
Parents are or were farmers or planters	59	61	61	68	72	67	69	75	70	63	67	58	66
Do.....do.....mechanics	14	12	15	22	22	25	22	21	16	14	14	13	12
Fathers....do.....judges or lawyers	27	25	30	35	33	30	29	23	34	33	34	35	36
Parents....do.....merchants	18	15	23	27	29	29	31	38	36	38	35	35	39
Do.....do.....boarding-house or hotel keeper	5	2	4	3	7	6	4	2	2	2	3	3	5
Fathers....do.....physicians	12	15	15	13	21	19	21	21	18	14	14	13	9
Do.....do.....of the army, navy, or marine corps	14	16	16	13	11	13	17	17	18	22	24	27	28
Do.....do.....clergymen	4	6	6	6	5	3	3	4	4	4	3	5	4
Do.....do.....in the civil employment of the general and State governments	5	15	16	9	5	2	3	7	7	8	10	11	14
Miscellaneous—as bank officers, editors, professors, engineers, masters of vessels, &c	15	11	15	23	35	36	41	24	32	30	30	26	14
Occupation not stated, or no occupation	48	34	23	17	1	2	2	8	7	11	13	7	10
Total	221	212	224	236	241	232	242	240	244	239	247	233	237
Of these numbers, there are without fathers living	26	57	44	48	42	41	54	48	40	45	36	35	29
Do.....do.....do.....do....father or mother living	22	16	18	15	21	20	18	16	26	17	19.	17	15
Total orphans	48	73	62	63	63	61	72	64	66	62	55	52	44
Of these numbers the parents are stated to be in moderate circumstances	.....	156	150	164	192	182	193	203	215	207	218	206	206
Of these numbers the parents are stated to be in reduced circumstances	182	26	26	36	35	38	40	29	25	16	9	8	8
Of these numbers the parents are stated to be in indigent circumstances	.....	6	8	8	8	8	4	4	2	2	.....	.....	1
Of these numbers the parents are stated to be independent in life	.....	6	10	12	6	4	5	4	2	14	20	19	22
Of these numbers the parents are stated to be in unknown circumstances	39	18	19	16	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	221	212	224	236	241	232	242	240	244	239	247	233	237

List of the officers, professors, and cadets, of the United States Military Academy, September 30, 1854, showing the name, rank, where born, and the State or country from which appointed.

ACADEMIC STAFF.

Names.	Rank.	Corps or regim't.	Where born.	Appointed from.	Department.
Robert E. Lee	Capt. & bvt. colonel	Engineers	Virginia	Milit'y academy.	Superintendent and commandant.
Dennis H. Mahon, LLD.	Professor		New York	Engineer corps.	Professor civil and military engineering.
Gustavus W. Smith	1st lieut. & bvt. capt.	do.	Kentucky	Milit'y academy.	Assistant professor of engineering.
George L. Andrews	2d lieutenant	do.	Massachusetts	do.	Acting assistant professor of engineering.
Wm. H. C. Bartlett, LLD.	Professor		Pennsylvania	Engineer corps.	Professor of natural and experimental philosophy.
Joseph J. Reynolds, AM	1st lieutenant	3d artillery	Kentucky	Milit'y academy.	Assistant professor of philosophy.
Edward D. Stockton	do	1st infantry	do	do	Acting assistant professor of philosophy.
Joseph H. Wheelock	2d lieutenant	4th artillery	Massachusetts	do	Do. do. do.
Albert E. Church, LLD.	Professor		Connecticut	3d artillery	Professor of mathematics.
William G. Peck, AM	1st lieutenant	Top. Engineers.	do	Milit'y academy.	Assistant professor of mathematics.
Delavan D. Perkins	do	4th artillery	New York	do	Acting assistant professor of mathematics.
Absalom Baird	do	1st artillery	Pennsylvania	do	Do. do. do.
Chauncey McKeever	do	3d artillery	Maryland	do	Do. do. do.
James Thompson	2d lieutenant	2d artillery	New York	do	Do. do. do.
Alex. J. Perry	do	do	Connecticut	do	Do. do. do.
Jacob W. Bailey, AM	Professor		Massachusetts	1st artillery	Professor chemistry, mineralogy, and geology.
Edward C. Boynton	1st lieut. & bvt. capt.	1st artillery	Vermont	Milit'y academy.	Assistant professor chemistry, mineralogy, and geology.
Caleb Huse	2d lieutenant	do	Massachusetts	do	Act'g assist't prof. chemistry, mineralogy, and geology.
Rev. Wm. T. Sprole	Professor		Maryland	Dist. Columbia	Chaplain, and professor ethics and English studies.
Henry Coffee, AM	1st lieut. & bvt. capt.	do.	Georgia	Milit'y academy.	Assistant professor ethics and English studies.
Charles C. Gilbert	1st lieutenant	1st infantry	Ohio	do	Acting assistant professor ethics and English studies.
Wm. Silvey	do	1st artillery	do	do	Do. do. do.
Joshua W. Sill	2d lieutenant	Ordnance corps	do	do	Do. do. do.
Robert W. Weir, N. A	Professor		New York	New York	Professor of drawing.
Richard S. Smith	1st lieutenant	4th artillery	Pennsylvania	Milit'y academy.	Assistant professor of drawing.
Thos. H. Neill	do	5th infantry	do	do	Acting assistant professor of drawing.
George W. Cullom	Captain	Engineers	New York	do	Instructor of practical military engineering.
Quincey A. Gillmore	2d lieutenant	do	Ohio	do	Assistant instructor of practical military engineering.
Thos. L. Casey	do	do	New York	do	Do. do. do.
Hyacinth R. Agnel	Professor		do	New York	Professor of the French language.
Theophilus d'Orémicolx	1st lieutenant	1st infantry	France	do	Assistant professor of the French language.

List of the officers, professors, and cadets, &c.—Continued.

Names.	Rank.	Corps or regim't.	Where born.	Appointed from.	Department.
John H. Greland	1st lieutenent	4th artillery	Pennsylvania	Milit'y academy.	Acting assistant professor of the French language.
Samuel F. Charfin	do	1st artillery	Illinois	do	Do. do. do.
Wm. H. F. Walker	Capt. & bvt. lt. col.	6th infantry	Georgia	do	Command't of cadets and instructor of infantry tactics.
Anderson D. Nelson	1st lieutenant	do	Kentucky	do	Assistant instructor of infantry tactics.
Henry B. Clitz	do	3d infantry	New York	do	Do. do. do.
Cadmus M. Wilcox	do	7th infantry	North Carolina	do	Do. do. do.
Milton Cogswell	2d lieutenant	8th infantry	Indiana	do	Do. do. do.
Fitz John Porter	1st lieut. & bvt. maj.	4th artillery	New Hampshire	do	Instructor of artillery and cavalry.
John Gibbon	1st lieutenant	do	Pennsylvania	do	Assistant instructor of artillery.
Delos B. Sackott	do	1st dragoons	New York	do	Assistant instructor of cavalry.
Robt. Ransom, jr	2d lieutenant	do	North Carolina	do	Do. do.
Patrice de Janon	Instructor		Carthagena	New York	Instructor of the sword exercise.

MILITARY STAFF.

James B. Fry	1st lieutenant	1st artillery	Illinois	Milit'y academy.	Adjutant.
John M. Cuyler	Surgeon	Med. Departm't.	Georgia	Georgia	
Joseph K. Barnes	Assistant surgeon	do	Pennsylvania	Pennsylvania	
Richard S. Smith	1st lieutenant	4th artillery	do	Milit'y academy.	Quartermaster, and assistant commissary subsistence and treasurer.

List of the officers, professors, and cadets, &c.—Continued.

CADETS.

No	Names.	Where born.	Whence appointed.
	First Class.		
1	Cyrus B. Comstock	Massachusetts	Massachusetts
2	Cornelius Van Camp	Pennsylvania	Pennsylvania
3	Godfrey Weitzel	Ohio	Ohio
4	James B. Wheeler	North Carolina	North Carolina
5	Ebenezer Gay	New Hampshire	New Hampshire
6	George H. Elliott	Massachusetts	Massachusetts
7	Samuel Breck, jr	do	do
8	Michael P. Small	Pennsylvania	Pennsylvania
9	John V. D. Dubois	New York	New York
10	Francis A. Shoup	Indiana	Indiana
11	John W. Turner	New York	Illinois
12	Alex. S. Webb	do	New York
13	Daniel McM. Gregg	Pennsylvania	Pennsylvania
14	James Wheeler, jr	New York	New York
15	Frederic L. Childs	Maine	Large
16	Francis L. Vinton	do	do
17	Francis R. T. Nicholls	Louisiana	Louisiana
18	Albert V. Colburn	Vermont	Vermont
19	John R. Church	Georgia	Georgia
20	Lewis Merrill	Pennsylvania	Pennsylvania
21	Wm. B. Hazen	Vermont	Ohio
22	Charles W. Thomas	Maine	Large
23	Alfred T. A. Torbert	Delaware	Delaware
24	Edward L. Hartz	Pennsylvania	Pennsylvania
25	George D. Ruggles	New York	New York
26	Clarence E. Bennett	do	do
27	W. W. Averell	do	do
28	Jas. H. Hill	Maine	Large
29	Marcus A. Reno	Illinois	Illinois
30	Timothy M. Bryan	Pennsylvania	Pennsylvania
31	Jesse K. Allen	Tennessee	Illinois
32	Wm. R. Pease	New York	New York
33	Henry M. Lasell	Massachusetts	Massachusetts
34	Henry W. Freedley	Pennsylvania	Pennsylvania
35	Robt. C. Hill	North Carolina	North Carolina
36	George McG. Deck	Pennsylvania	Pennsylvania
	Second Class.		
1	David C. Houston	New York	New York
2	Miles D. McAlister	do	Michigan
3	George W. Snyder	do	New York
4	Charles C. Lee	South Carolina	North Carolina
5	A. Parker Porter	Pennsylvania	Pennsylvania
6	Orlando M. Poe	Ohio	Ohio
7	Henry V. De Hart	New York	Large
8	Guilford D. Bailey	do	New York
9	George D. Bayard	New Jersey	Large
10	Herbert A. Hascall	New York	New York
11	Wm. Gaston	North Carolina	Large
12	John B. Shinn	New Jersey	Ohio
13	Edmund C. Bainbridge	Virginia	Large
14	Hylan B. Lyon	Kentucky	Kentucky
15	James P. Major	Missouri	Mississippi
16	Joseph H. Taylor	Kentucky	Large
17	Lorenzo Lorain	Pennsylvania	Pennsylvania
18	Wesley Owens	Ohio	Ohio
19	Wm. B. Hughes	Tennessee	Tennessee
20	Richard Lodor	New York	New Jersey
21	Thomas W. Walker	Indiana	Indiana
22	James W. Forsyth	Ohio	Ohio

List of the officers, professors, and cadets, &c.—Continued.

No	Names.	Where born.	Whence appointed.
23	John F. Ritter	Pennsylvania	Pennsylvania
24	John Bennett	Ohio	Ohio
25	George Jackson	..do	Virginia
26	Herman Biggs	New York	New York
27	Thomas C. Sullivan	Ohio	Ohio
28	John K. Mizner	New York	Michigan
29	Jeremiah H. Gilman	Maine	Maine
30	Thomas E. Miller	Kentucky	Kentucky
31	John Tipton	Indiana	Indiana
32	Lumford L. Lomax	Rhode Island	Large
33	John W. Barriger	Kentucky	Kentucky
34	Wm. H. Jackson	Tennessee	Tennessee
35	James McMillan	New York	New York
36	Samuel S. Carroll	District of Columbia	District of Columbia
37	Owen K. McLemore	Alabama	Alabama
38	Hamilton S. Hawkins	South Carolina	Large
39	Charles B. Stivers	Kentucky	Kentucky
40	James B. S. Alexander	Virginia	Virginia
41	John C. Frary	New York	Indiana
42	Wm. T. Gentry	Indiana	....do
43	Israel C. Morris	Pennsylvania	Pennsylvania
44	A. Sinclair Cunningham	Virginia	Large
45	Brayton C. Ives	New York	New York
46	Frank S. Armistead	Virginia	Large
47	J. McLean Hildt	Pennsylvania	..do
48	John B. Fort	Louisiana	Louisiana
49	Fitzhugh Lee	Virginia	Large
50	Richard S. C. Lord	Ohio	Ohio
51	Jacob Sharp	New York	New York
52	Wm. P. Sanders	Kentucky	Mississippi
53	Herbert M. Enos	New York	New York
	Third Class.		
1	John C. Palfrey	Massachusetts	Massachusetts
2	George C. Strong	Vermont	.....do
3	Richard K. Meade, jr.	Virginia	Virginia
4	C. Porter Alexander	Georgia	Georgia
5	J. L. K. Smith	New York	Large
6	Henry M. Robert	South Carolina	Ohio
7	Thomas S. Baylor	Virginia	Virginia
8	Wm. P. Smith	....do	....do
9	George A. Kensel	Pennsylvania	Kentucky
10	Charles H. Morgan	New York	New York
11	John M. Corse	Pennsylvania	Iowa
12	Thomas J. Berry	Georgia	Georgia
13	Oliver H. Fish	Kentucky	Kentucky
14	Selden S. Hetzel	District of Columbia	Large
15	Haldeman T. Putnam	New Hampshire	New Hampshire
16	Charles J. Walker	Kentucky	Kentucky
17	George A. Cunningham	Georgia	Alabama
18	George H. Weeks	New Hampshire	Maine
19	Augustus G. Robinson	Maine	..do
20	Harry C. McNeil	Mississippi	Texas
21	John S. Marmaduke	Missouri	Missouri
22	Francis Beach	Connecticut	Connecticut
23	Ed. M. Crumpton	Illinois	Indiana
24	Manning M. Kimmell	Missouri	Missouri
25	Solomon Williams	North Carolina	North Carolina
26	Sardine P. Reed	Ohio	Ohio
27	Abm. C. Wildrich	New Jersey	New Jersey
28	Richard H. Brewer	Maryland	Maryland
29	Oliver P. Gooding	Indiana	Indiana
30	Rodman P. Lewis	New York	California
31	Edward C. Burnet	Indiana	Indiana

List of the officers, professors, and cadets, &c.—Continued.

No	Names.	Where born.	Whence appointed.
32	Joseph S. Conrad	New York	New York
33	John T. Magruder	Virginia	Large
34	Ira W. Claflin	Vermont	Iowa
35	George Ryan	Massachusetts	Connecticut
36	And. Jackson, jr	Tennessee	Large
37	Ed. J. Conner	New Hampshire	New Hampshire
38	Robert H. Anderson	Georgia	Georgia
39	Ed. R. Warner	Pennsylvania	Pennsylvania
40	Charles E. Farrand	New York	New York
41	William Sinclair	Ohio	Ohio
42	Aurelius F. Cone	Georgia	Georgia
43	William H. Bell	Pennsylvania	Pennsylvania
44	Ellison L. Costin	Virginia	Virginia
45	Lafayette Peck	Tennessee	Tennessee
46	James Fulton, jr	....do	....do
47	P. O. Craig	Massachusetts	Large
48	Thomas J. Lee	Indiana	Indiana
49	George W. Holt	Alabama	Alabama
50	P. J. Quattlebaum	South Carolina	South Carolina
51	Thomas W. Thurston	District of Columbia	Large
52	Wimer Bedford	Pennsylvania	Pennsylvania
53	John M. McCaffrey	Maryland	Ohio
54	William A. J. McGrath	New York	New York
55	George N. Bascom	Kentucky	Kentucky
56	Frank Graves	Michigan	Michigan
57	Charles Durfie	Ohio	Ohio
58	Samuel Ferguson	South Carolina	South Carolina
	Fourth Class.		
1	John A. Abert	Mississippi	Mississippi
2	Ruffin Y. Ashe	Alabama	Alabama
3	Wm. B. Barnes	Indiana	Indiana
4	S. D. Beekman	New York	New York
5	Harold Borland	North Carolina	Arkansas
6	James M. Brien	Tennessee	Tennessee
7	Asa B. Carey	Connecticut	Connecticut
8	Samuel M. Cooper	Virginia	Large
9	Ed. P. Crossey	New York	New York
10	Rollin C. Curtis	Ohio	Ohio
11	George W. Cushing	Rhode Island	Rhode Island
12	John W. Dewey	Vermont	Vermont
13	Joseph Dixon	Tennessee	Tennessee
14	William H. Echolls	Alabama	Alabama
15	Newton S. Finney	New York	Wisconsin
16	Royal T. Frank	Maine	Maine
17	W. H. Fulkerson	Tennessee	Tennessee
18	Wm. W. Gordon	....do	....do
19	Peter Hairston, jr	Virginia	Virginia
20	J. H. Hollonguist	South Carolina	South Carolina
21	Luke G. Harmon	New York	New York
22	Charles G. Harker	New Jersey	New Jersey
23	Charles H. Ingraham	Ohio	Massachusetts
24	Charles E. Jesup	District of Columbia	Large
25	Wells Kellogg	Ohio	Ohio
26	Robert C. Kennedy	Georgia	Louisiana
27	G. T. McCulloch	Maryland	Maryland
28	Samuel McKee	Missouri	Utah
29	Wm. P. Macmanus	Pennsylvania	Pennsylvania
30	Marcus P. Miller	Massachusetts	Massachusetts
31	Charles S. Morgan, jr	Virginia	Virginia
32	Charles H. Moss	New York	New York
33	John A. Myers	South Carolina	South Carolina
34	Leroy Napier, jr	Georgia	Georgia
35	Wm. J. L. Nicodemus	Virginia	Maryland

List of the officers, professors, and cadets, &c.—Continued.

No	Names.	Where born.	Whence appointed.
36	Wm. C. Paine	Massachusetts	Massachusetts
37	Benjamin F. Phillips	Georgia	Mississippi
38	Joseph C. Riddle	New Hampshire	Wisconsin
39	Wm. G. Robinson	Canada	North Carolina
40	Rufus H. Sage	New York	New York
41	John S. Saunders	Virginia	Large
42	Thomas F. Spragins	Illinois	Illinois
43	Thomas R. Tannett	New York	Massachusetts
44	Bryan M. Thomas	Georgia	Georgia
45	James J. Van Horn	Ohio	Ohio
46	Allen C. Waterhouse	Maine	Illinois
47	Moses J. White	Mississippi	Mississippi
	Fifth Class.		
1	Thomas E. Ames	Massachusetts	Massachusetts
2	William S. Anderson	Texas	Texas
3	Latham Anderson	Ohio	Ohio
4	Abraham K. Arnold	Pennsylvania	Pennsylvania
5	Eugene M. Baker	New York	New York
6	Robert F. Beckham	Virginia	Virginia
7	John R. B. Burtwell	Alabama	Alabama
8	Ed. G. Bush	Illinois	Illinois
9	Gustavus Campbell	Virginia	Virginia
10	Elias B. Carting	Maryland	Maryland
11	Caleb H. Carlton	Ohio	Ohio
12	Charles R. Collins	Pennsylvania	Pennsylvania
13	Francis J. Crilley	....do	.....do
14	George H. Crossman, jr	....do	.....do
15	Samuel A. Foster	Maine	Maine
16	Frank C. Goodrich	New Hampshire	Large
17	Francis L. Guonther	New York	New York
18	Jonathan N. Hall	....do	Michigan
19	Martin D. Hardin	Illinois	Large
20	James C. Harvey	Missouri	Mississippi
21	Isaac S. Hyams	Louisiana	Louisiana
22	Edwin Ilsley	Maine	Maine
23	Ed. T. Jennings	Illinois	Oregon
24	Henry P. Jones	Ohio	Ohio
25	John M. Kerr	North Carolina	North Carolina
26	Theodore Koener	Illinois	Illinois
27	John C. Landis	Missouri	Mississippi
28	James B. Lagear	Pennsylvania	Pennsylvania
29	Samuel H. Lockett	Virginia	Alabama
30	John G. McConnell	Pennsylvania	Pennsylvania
31	William E. Merrill	Wisconsin	Large
32	George T. Peckham	New York	New York
33	Chauncey B. Reese	....do	....do
34	Hezekiah C. Rice	South Carolina	South Carolina
35	Edward Ross	New York	Large
36	Augustus H. Rutherford	Georgia	Georgia
37	Nelson A. Sowers	Indiana	Indiana
38	Roderick Stone	Maine	Maine
39	Edwin H. Staughton	Vermont	Vermont
40	Joshua P. V. Sate	North Carolina	Arkansas
41	John J. Upham	Delaware	Wisconsin
42	Francis W. Van Brunt	New Jersey	New Jersey
43	Benjamin O. Wade	North Carolina	Kentucky
44	Orlando G. Wagner	Pennsylvania	Pennsylvania
45	J. E. M. P. Washington	South Carolina	Large
46	Alphonso Wetmore	Missouri	Missouri
47	Isaac T. Wheeler	Virginia	Virginia
48	Robert White	Tennessee	Tennessee
49	James Wilson	Louisiana	Large
50	William Wonderly	Maryland	Maryland

List of the officers, professors, and cadets, &c.—Continued.

No	Names.	Where born.	Whence appointed.
51	Henry A. F. Worth	Virginia	Large
52	Moses H. Wright	Tennessee	Tennessee
53	Joseph Wright	Pennsylvania	Pennsylvania
54	Joseph Wheeler	Georgia	New York
55	James Zabriski	New Jersey	California

R. E. LEE,
Bvt. Col. and Capt. Eng. U. S. A., and Sup't Mil. Acad.

HEADQUARTERS U. S. ARMY,
West Point, September 30, 1854.

Letter explanatory of the Military Academy Estimates.

UNITED STATES MILITARY ACADEMY,
West Point, Octobur 7th, 1854.

GENERAL: I have the honor to present an estimate of funds for the fiscal year ending June 30th, 1856, for the United States Military Academy.

The usual amount appropriated for repairs and improvements has been increased by $2,900 for the payment of the enlisted men on extra duty, the additional compensation granted by the law of 4th August, 1854. It has also been necessary to add $600 to the estimate for fuel, and $325 to that for forage; in consequence of the enhanced price of those articles. The last register of the graduates of the academy was published in 1850. It is proposed to publish one every five years, instead of triennially as heretofore; and to provide for the publication of the Register of 1855, $1,225 has been added to the last year's estimate for printing.

The clerk of the adjutant of the academy, is charged with the record of all the rolls, reports, &c., of the recitations, conduct, and standing of the cadets. His duties, besides being laborious, require much care and accuracy. His pay for many years has been $500 per annum. The increased expense of living, and the inadequate compensation of his services, has induced me to ask for an addition of $100 to his pay.

In the department of artillery the estimate has been increased $190, to provide means for the increased instruction in fencing. The fourth and fifth classes are now taught fencing, and the latter receives about double the quantity of instruction heretofore given the former. An additional number of foils, masks, &c., are consequently required.

The other items under the head of current and ordinary expenses, are about the same as usually required, and differ but little from the amounts heretofore appropriated.

It has become necessary to increase the estimate to defray the expenses of the board of visitors, appointed under the act of 8th August, 1846, or to diminish the number of members, The additional number of States and extension of territory since the passage of the act renders he usual appropriation insufficient. Taking the expenses of the board

the present year as a criterion for that for 1856, it has been necessary to add $1,160 to the estimate.

The furniture of the cadets' hospital, being completely worn out and reported unfit for use by the surgeon, and the building having been enlarged and provided with eight new wards, I have introduced $500 in the estimate to furnish it with plain and necessary articles of furniture.

The introduction of gas light into the cadets' barrack, offices, and academies would greatly promote economy, cleanliness, and comfort. The barrack was built with this view, and I have introduced into the present estimate $15,000 for the purpose of building a gas-house, and providing the necessary pipes and burners. The consumption of the gas will be paid for by the cadets; will be a saving to them, and no additional expense to the government.

I feel it my duty again to call your attention to the want of proper quarters for the accommodation of the professors, officers, and soldiers at the academy. The professors' houses do not afford sufficient room for their families. The portion of the cadets' barrack, necessarily occupied by the officers, for want of other quarters, is required for the accommodation of the cadets, for whom it was built. No quarters have ever been provided for the company of sappers and miners. The officers are quartered a quarter of a mile from their men, and the men occupy quarters built for the artillery detachment, who are crowded on the dragoons. The control and supervision, necessary for instruction and discipline, cannot under these circumstances be maintained, and the health and comfort of the men are also impaired.

I have added to the estimate $5,000 for the additions to the professors' quarters; and $20,000 for the commencement of officers' quarters; according to the plans already submitted to the department. For the construction of quarters for officers and men of the sappers and miners, grading and enclosing company grounds, &c., according to the plans also submitted and approved, $24.500 will be required, in addition to the amount on hand.

I also transmit an estimate of funds to meet the deficiency of appropriations of the past and present fiscal years, which is therein explained.

I am, very respectfully, your obedient servant,

R. E. LEE,
Bvt. Col., Sup't Military Academy.

en. JOSEPH G. TOTTEN,
Chief Engineer, Washington, D. C.

THE MILITARY ACADEMY.

REPORT OF THE BOARD OF VISITORS.

MILITARY ACADEMY, *West Point, June* 22, 1854.

SIR: The Board of Visitors invited to attend the annual examination of the Military Academy have performed the duty assigned them, and respectfully submit the following report upon the various topics referred to in your letter of instructions.

The Board take pleasure in stating that every facility was afforded by the superintendent and other officers of the institution to enable them to discharge the trust confided to them. Every department of the academy was submitted to their inspection, and every species of information necessary to a correct understanding of its practical operations was promptly and cheerfully furnished.

After a very careful examination of the course of instruction prescribed by existing regulations, the Board was deeply impressed with the wisdom of those by whom that system was devised. It is difficult to conceive one more perfect in its general arrangement. The same wisdom is displayed in the distribution of studies among the different classes. Subjects of investigation, at first comparatively simple, become gradually more complicated as the student approaches the termination of that course when the honors of the academy are conferred upon him. Each step taken in that course sheds light upon the succeeding one. Thus the path which, under a system less perfect would be obscure, is made plain, and difficulties apparently formidable are easily surmounted.

The examination of the cadets in the presence of the Board, from day to day, while it strengthened the conviction we have expressed in respect to the course of studies, afforded abundant evidence that the mode of instruction was as perfect as could well be devised.

The severe tests to which the cadet is subjected under the plan now adopted precludes the possibility of substituting for the deductions of reason the mere efforts of memory. The results of these examinations were generally quite satisfactory, furnishing not only satisfactory evidence of the diligence of the cadets, but of the distinguished ability of their instructors, and of their skill and judgment in imparting knowledge to the youths committed to their charge. In this connexion the Board cannot withhold the expression of their admiration in witnessing the patience and impartiality of the gentlemen to whom the responsible trust of teaching is confided. Mutual confidence and kindly sympathies exist between professor and student, without impairing the authority of the former or inducing false expectations on the part of the latter, The existence of such relations is shown not to be incompatible with the higher claims of justice or with the enforcement of the most rigid dicipline.

Instruction in the various arms of the service is taught theoretically and practically. The officers entrusted with the duty of instruction in this department have exhibited qualifications of a high order. The precision and accuracy with which manœuvres were executed in the field commanded the admiration of the Board. It is among the distinguishing excellences of the Military Academy that the best scientific education and highest mental culutre are combined with these manly exercises, which impart vigor to the constitution, and thus secure to the student that bodily health, strength and activity so essential to the profession of arms.

According to the existing regulations, the assistant and acting assistant professors are detailed from the army; and the Board regard it as eminently important that, when designated for the performance of that duty at the commencement of the academic year, their services

should be secured to the institution at least until its close. The Board are aware that the public exigencies may demand the services of these officers in other fields of duty, but the reasons upon which this recommendation is founded are so obvious and cogent as to commend it to the adoption of the government.

Immediately connected with the course of instruction is a subject to which the Board beg leave to invite, in a special manner, the attention of the Secretary of War.

By the existing regulations, young men are permitted to become members of the institution after having attained the age of sixteen years. The history of the academy, and the judgment of those whose experience gives force to their opinions, prove very conclusively that, in many instances, young gentlemen who enter at that early age are not prepared to master the complicated subjects constituting the first year's course. The consequences are necessarily disastrous to the prospects of many meritorious youths. Their failure to attain the standard exacted by the regulations of the academy, and to grapple successfully with the complex subjects which engage their attention during their first year's service, arises in many instances from an exceedingly defective education. The intellectual powers, never having been cultivated, remain undeveloped; and thus, for the want of that previous mental discipline so necessary to success, the hopes of both parent and child are often crushed. Two remedies have been suggested for this great evil: first, by requiring a higher standard than that now prescribed as a prerequisite to admission; second, by extending the course of studies through a period of five instead of four years. The adoption of the plan just suggested is liable to the serious objection that a considerable proportion of the cadets are selected from that large and highly respectable class whose parents cannot command the means necessary to qualify them for admission under the proposed regulation. Thus an invidious distinction would be created, and the benefit of the institution would to a great extent be confined to the more fortunate whose parents are in a condition to fit them for the preliminary examination. Should the term of service be extended to five years, it is believed that the difficulties which beset the path of many interesting young men would be removed. The subjects embraced in the first year's course should be of a character to discipline the mind and prepare it for the investigation of those of a more complicated nature. Other advantages would result from the plan now proposed, and which deserve notice. Instruction might with great advantage be given in history, elocution, and composition without tasking too severely the physical or mental powers of the student. The board regret to find that the study of history is not and cannot be embraced in the course of instruction. Thus, while the scientific and military education of the cadet is very complete, he enters the army with no other knowledge of history than may have been acquired before his connexion with the academy. An evil so glaring and palpable can only find a remedy by the adoption of the recommendation now proposed.

While the Board were impressed with the thorough and accurate knowledge generally exhibited in the exact sciences, the necessity of requiring instruction in elocution was quite manifest. In many in-

stances there was the absence of that facility of expression, accuracy of style, and clearness of pronunciation which can only be acquired by exacting a more extended course of instruction in English studies and making composition and elocution part of the course of instruction.

The duties of the acting assistant professors are of a highly important and responsible nature. The selection of these officers is suggested by the ability they have displayed in the several branches of learning taught at the academy, and their skill and tact as instructors of youth. To reap the full benefits of the system which now prevails, it is essential that the services of this class of officers should, as far as possible, be secured to the institution, thus uniting practical experience to acknowledged ability. The assistant professors now receive additional compensation in consideration of the duties they perform, and the Board perceive no reason why the same measure of justice should not be extended to officers holding subordinate positions. The Board, therefore, earnestly recommend that provision be made for such increase of pay to acting assistant professors as may be deemed equitable.

Discipline, so necessary to the very existence of the academy, is enforced with firmness, and, as the Board believe, with strict impartiality. The penalties consequent on a violation of the code of laws prescribed for its government are of a nature to secure obedience, while their tendency is not to degrade the cadet, except, indeed, after repeated admonitions, his disregard of duty, and of obligations cast upon him when he becomes a member of the academy, render his further connexion with it inconsistent with its safety and well-being. The extreme penalty of expulsion is only enforced, however, when the offence is of a character so grave as to demand its execution. The happy fruits of the system of discipline now in force may be seen in the general spirit of subordination, manly bearing, and gentlemanly deportment so strikingly manifested by the corps of cadets.

For an extended and satisfactory view of the fiscal affairs of the academy the Board beg leave to refer to the report of the committee on that subject, with the documents by which it is accompanied. After the most careful and mature deliberation, the Board, with entire unanimity, recommend an increase of the pay of the cadets. This recommendation is founded on the reasons disclosed in that report. They are of a nature so conclusive as to render discussion unnecessary. Experience has shown that, with the most rigid economy, the pay allowed by law to the cadet is insufficient for his support. The result is that when graduated he finds himself burdened with a debt he is not in a condition to discharge. In regulating the pay of the cadet precisely such sum should be allowed as will place him with proper economy beyond the reach of want.

The Board have noticed with surprise the inequality which now exists in respect to the pay of the professors. The professors of French and drawing, although members of the Academic Board, and distinguished in their respective departments, receive a compensation of fifteen hundred dollars, while the other professors with whom they are associated on the Board, and the instructor of infantry tactics, each receive two thousand dollars a year. Independent of the impolicy of placing the several professors on a different footing in respect to pay,

the Board affirm with entire confidence that the salary now allowed to the professors of French and drawing is inadequate to their support. The expense of living at the Military Academy has recently increased to such an extent as to make it quite impossible for these gentlemen, with the most exact economy, to live in a manner befitting their stations. The best energies of the professors should be, and indeed are, given to the government, and in return the eminent gentlemen to whom has been confided a trust calling for the exercise of the highest qualities of mind and heart should receive a compensation proportioned to the responsibilities cast upon them. The pressure of pecuniary embarrassment should not be felt by those who are called upon to discharge duties of a nature so delicate and laborious. While on this subject, the Board earnestly recommend a small appropriation of five hundred dollars with a view to the improvement of the quarters assigned to the professors. This amount, in addition to that now in the treasury and applicable to this object, will be sufficient to render the professors and their families comparatively comfortable.

Appropriations are also necessary for quarters for the meritorious and able officers having families, who now discharge important functions at the academy. Withdrawn from the ordinary duties of their profession, ample provision should be made for their comfort and that of their families.

The Board have ascertained that at some seasons of the year the supply of water is inadequate, and recommend that appropriation be made to remedy this inconvenience.

The Board also concur with the views of the Committee on Police in respect to the importance of providing additional quarters for those officers who have rooms assigned to them in the cadet barracks. The inconveniences resulting from the existing state of things demand a prompt remedy at the hands of the government.

The attention of the Board was drawn to the condition of the hospitals provided for the cadets and troops stationed at the academy. While the hospital provided for the enlisted men is in every respect comfortable, that provided for the cadets is not so complete in its arrangements as could be desired. The appropriation already made, we are informed by the distinguished gentleman now in charge, will render it sufficiently commodious. The wards, however, should be immediately provided with new furniture. What remains of the old is unfit for use. An appropriation of five hundred dollars is all that is necessary to accomplish this desirable object. Special attention is directed to the manner in which attendants are provided. Instead of relying upon the laborers of the garrison, men should be enlisted for that particular service. Care should be taken in their selection, and every proper motive held out to secure their services, after experience shall have fitted them for the duties incident to a hospital.

For a more minute and extended view of the operations of the Military Academy we beg leave to refer to the several reports of the committees herewith transmitted. They convey valuable information in relation to the various topics to which the attention of the Board is directed in your letter of instructions.

The Board avail themselves of the opportunity now presented of ex-

pressing their profound conviction of the great value of the Military Academy, and commend it to the liberal support of the government. Whilst rigid economy should control the action of Congress in respect to appropriations, they earnestly trust that no mistaken views on this subject will retard its advancement, until it shall attain that standard of perfection worthy of the great nation by which it is fostered. At no former period of its history has it presented stronger claims to the confidence and affection of the American people.

The Board cannot conclude this report without bearing testimony to the eminent qualifications of the superintendent for the honorable and distinguished post assigned him by the government. Services conspicuous in the field, and when our country was engaged in a war with a foreign nation, have lost none of their lustre in the exalted position he so worthily fills.

The Board desire also to record the high sense they entertain of the zeal, ability, and energy displayed by the learned gentlemen who have been placed at the head of the several departments of the academy. To them in a great degree is due its present exalted character.

Respectfully submitted,

CHARLES W. WHIPPLE, Michigan,
President of the Board.
SHERRARD CLEMENS, Virginia,
Secretary of the Board.
WM. C. CLARKE, New Hampshire.
SAMUEL J. BAYARD, New Jersey.
WM. W. LEA, Tennesee.
JOHN JARVIN MORRISON, Indiana.
JOHN S. HACKER, Illinois.
WINSLOW TURNER, Missouri.
L. B. LUCKIE, Arkansas.
RICHARD D. TREVILLE, South Carolina.
H. M. KINSEY, Texas.
GEORGE HOLTZBECKER, Delaware.
JOHN B. HARMON, California.
L. B. DICKERSON, Kentucky.
ROBERT ALLYN, Rhode Island.

Hon. JEFFERSON DAVIS,
Secretary of War.

REPORT OF THE COMMITTEE ON FISCAL AFFAIRS.

To the Board of Visitors at the United States Military Academy 1854:

The committee on fiscal affairs respectfully report—

That schedule A contains a statement of funds available, and disbursements made by the superintendent of the academy during the fiscal year ending June 30, 1854, and to include the 7th day of June, 1854, from which it appears that the amount unexpended of the appropriation for the fiscal year ending June 30, 1853, is the sum of $31,501 74.

That the amount of the appropriation for the fiscal year ending June 30, 1854, is $54,780 00, the amounts received from other sources $1,339 52, making the whole available funds for the fiscal year ending June 30, 1854, the sum of $87,621 26.

That schedule B contains a statement of the rank, pay, and emoluments, of the officers, professors, instructors, cadets, and employés at the academy, from which it appears that five of the professors receive each the sum of $2,000 per annum, while two others, the professors of drawing and French, are in the annual receipt of only $1,500 each; and your committee are at a loss, whether they consider the importance of the professorships or the character of the gentlemen who fill them, to understand the reason of the difference in the several salaries, and they recommend that the pay of the professors of drawing and French be raised to the sum of $2,000 each.

Schedule C contains a statement of authorized amounts paid by the treasurer of the academy on account of cadets from May 1, 1853, to May 1, 1854, showing the average amount applicable for each cadet for two months to be $54 03, while the amount received from the government of the United States for the same time is only $48 00, making the amount expended on his account for two months to be $6 03.

The same schedule also contains a recapitulation of disbursements, made by the treasurer on account of cadets from May 1, 1848, to April 30, 1853, a period of five years, from which it appears that the average difference between the pay for two months and the amount expended on account of each cadet is $6 69 against him.

The same paper also contains twenty-six items of the cadets' expense, with remarks against each.

Paper D was called for by the committee, and contains balances paid by the treasurer of the academy to ten members of each graduated class, on the final settlement of their accounts, from the year 1848 to 1853 inclusive, exhibiting five cadets of each class who have received the largest amount and five who have received the smallest.

A careful examination of this and the preceding paper, together with their own observations and inquiries, has satisfied your committee that even with the rigid system of economy and accountability now practised by the cadet, he cannot meet the necessary expense of the course with the pay he now receives, and they therefore recommend that his monthly pay be raised to $33 per month, in accordance with the bill reported to the Senate of the United States.

Paper E contains a list of appropriations for the support of the academy for the year ending June, 1855.

The management of the fiscal affairs of this institution seem, to your committee, to be on an admirable footing.

WM. C. CLARKE,
H. M. KINSEY,
WINSLOW TURNER,
Committee.

A.

Statement of funds available, and disbursements made by the Superintendent of the U. S. Military Academy during the fiscal year ending June 30, 1854.

For what purpose.	Amount unexpended of the appropriation for the fiscal year ending June 30, 1853.	Appropriation for the fiscal year ending June 30, 1854.	Amounts received from other sources.	Total available for fiscal year ending June 30, 1854.	Expended, to include June 7, 1854.	Available, June 7, 1854.
Repairs and improvements	.....	$9,000 00	*a* $954 27	$9,954 27	$9,524 27	$430 00
Fuel	$546 16	7,200 00	.....	7,746 16	6,637 93	1,108 23
Forage	834 50	1,760 00	.....	2,594 50	1,921 26	673 24
Postage	31 53	50 00	.....	81 53	25 89	55 64
Stationary	177 71	300 00	.....	477 71	264 67	213 04
Transportation	193 35	1,800 00	.....	1,993 35	1,303 92	689 43
Printing	286 83	1,000 00	.....	1,286 83	1,103 94	182 89
Clerks	.....	1,900 00	.....	1,900 00	1,658 33	241 67
Miscellaneous and incidental expenses	1,181 34	3,040 00	.....	4,221 84	2,841 82	1,379 52
Department of engineering	1,613 73	1,000 00	.....	2,613 73	.....	2,613 73
Do.....philosophy	93 52	500 00	.....	593 52	477 01	116 51
Do.....mathematics	236 68	50 00	.....	286 68	37 60	249 08
Do.....chemistry, &c	59 49	650 00	.....	709 49	416 87	292 62
Do.....ethics	73 37	100 00	.....	173 37	14 68	158 69
Do.....drawing	74 39	210 00	.....	284 39	230 18	54 21
Do.....practical engineering	.....	100 00	.....	100 00	.....	100 00
Do.....infantry tactics	59 90	300 00	.....	359 90	43 57	316 33
Do.....artillery and cavalry	98	700 00	.....	700 98	502 86	198 12
Improvements and additions to officers' quarters	3,000 00	.....	.....	3,000 00	.....	3,000 00
Additional compensation to enlisted men	.....	150 00	.....	150 00	112 50	37 50
Gradual increase and expense of library	119 78	1,000 00	.....	1,119 78	946 91	172 87
Board of Visitors	275 88	3,000 00	.....	3,275 88	.....	3,275 88
Stables for artillery and cavalry horses	.....	8,000 00	.....	8,000 00	.....	8,000 00

A—Continued.

Statement of funds available, and disbursements made by the Superintendent of the U. S. Military Academy during the fiscal year ending June 30, 1854.

For what purpose.	Amount unexpended of the appropriation for the fiscal year ending June 30, 1853.	Appropriation for the fiscal year ending June 30, 1854.	Amounts received from other sources.	Total available for fiscal year ending June 30, 1854.	Expended, to include June 7, 1854.	Available, June 7, 1854.
Forage for artillery and cavalry horses	$68 19	$8,640 00	.....	$8,708 19	$7,633 75	$1,074 44
Apparatus for warming buildings	2,500 00	.....	.....	2,500 00	.....	2,500 00
Cavalry exercise hall	2,000 00	.....	.....	2,000 00	.....	2,000 00
Construction of a new wharf	.....	4,330 00	.....	4,330 00	4,330 00	.....
New equatorial telescope	5,000 00	.....	.....	5,000 00	.....	5,000 00
Purchase of artillery and cavalry horses	3,074 41	.....	b 385 25	3,459 66	2,948 00	511 66
Erecting barracks for engineer troops	10,000 00	.....	.....	10,000 00	.....	10,000 00
	$31,501 74	$54,780 00	$1,339 52	$87,621 26	$42,975 96	$44,645 30

a Derived from wood cut on public land $792 63
Do ..... old iron 128 14
Do ..... manure 33 50
954 27

b Do ..... sale of 11 condemned horses 385 25
$1,339 52

Of the amount available there remains in the Treasury of the United States $40,039 04
Do ..... do ..... hands of the Superintendent 4,606 26

Available $44,645 30

QUARTERMASTER'S OFFICE, U. S. MILITARY ACADEMY,
West Point, New York, June 8, 1854.

R. S. SMITH,
Lieutenant and Quartermaster U. S. Military Academy.

B.—*Statement of the rank, pay, and emoluments, of the officers, professors, instructors, cadets, and employés, at the United States Military Academy, West Point, New York.*

No.	Office.	Rank.				Remarks.
1	Superintendent	Brevet colonel	$2,628 00	.....	$2,628 00	
1	Professor of engineering	.....	.....	$2,000 00	2,000 00	
1	Assistant professor	1st lieut. engineers and brevet captain	981 96	200 00	1,182 00	
1	Acting assistant professor	1st lieut. engineers	981 96	.....	981 96	
1	Professor of natural and experimental philosophy	.....	.....	2,000 00	2,000 00	
1	Assistant professor	1st lieut. artillery	834 00	348 00	1,182 00	
1	Acting professor	1st lieut. infantry	834 00	.....	834 00	
1	....do.....do	2d lieut. artillery	774 00	.....	774 00	
1	Professor of mathematics	.....	.....	2,000 00	2,000 00	
1	Assistant professor	1st lieut. topographical engineers	981 96	200 04	1,182 00	
2	Acting professors	1st lieut. artillery, each	834 00	.....	834 00	
3	....do.....do	2d lieut. artillery, each	774 00	.....	774 00	
1	Professor of chemistry	.....	.....	2,000 00	2,000 00	
1	Assistant professor	1st lieut. artillery and bvt. capt	834 00	348 00	1,182 00	
1	Acting professor	2d lieut. artillery	774 00	.....	774 00	
1	Professor of ethics	.....	.....	2,000 00	2,000 00	
1	Assistant professor	1st lieut. artillery and bvt. capt	834 00	348 00	1,182 00	
1	Acting professor	1st lieut. infantry	834 00	.....	834 00	
1	....do.....do	1st lieut. artillery	834 00	.....	834 00	
1	Professor of drawing	.....	.....	1,500 00	1,500 00	Disbursed by pay master's department.
1	Assistant professor	1st lieut. artillery	1,002 00	348 00	1,350 00	
1	Acting professor	1st lieut. infantry	834 00	.....	834 00	
1	Instructor of practical engineering	Captain engineers	1,302 00	.....	1,302 00	
2	Assistant instructors	2d lieut. engineers, each	981 96	.....	981 96	
1	Assistant instructor	Bvt. 2d lieut. engineers	981 96	.....	981 96	
1	Professor of French	.....	.....	1,500 00	1,500 00	
1	Assistant professor	1st lieut. infantry	834 00	348 00	1,182 00	
2	Acting professors	1st lieut. artillery, each	834 00	.....	834 00	
1	Instructor of infantry tactics	Captain infantry and bvt. major	1,074 00	926 00	2,000 00	
3	Assistant instructors	1st lieut. infantry, each	834 00	120 00	954 00	
1	Assistant instructor	2d lieut. infantry	774 00	120 00	894 00	
1	Instructor of artillery and cavalry	1st lieut. artillery and bvt. major	1,668 00	.....	1,668 00	

B—Continued.

No.	Office.	Rank.				Remarks.
1	Assistant instructor of artillery	1st lieut. artillery	$834 00	.....	$834 00	
1	Assistant instructor of cavalry	1st lieut. dragoons	1,077 96	.....	1,077 96	
1	....do.....do.....do	2d lieut. dragoons	1,077 96	.....	1,077 96	
1	Instructor of sword exercise		.....	$720 00	720 00	
1	Surgeon	Surgeon	.....	1,778 00	1,778 00	
1	Assistant Surgeon	Assistant surgeon	.....	1,470 00	1,470 00	
1	Adjutant	1st lieut	.....	834 00	834 00	
	Cadets, each		.....	288 00	288 00	See Treasurer's report for detailed statement of cadet's accounts.
1	Clerks: Disbursing officer and quartermaster		.....	900 00	900 00	Disbursed by Superintendent Military Academy.
1	Clerks: Treasurer		.....	500 00	500 00	
1	Clerks: Adjutant		.....	500 00	500 00	

NOTE.—In addition to army pay, all officers receive an additional ration for every five years' service, the value of which is commuted at $6 per month.

R. S. SMITH, *Lieutenant and Quartermaster U. S. M. A.*

QUARTERMASTER'S OFFICE U. S. MILITARY ACADEMY,
West Point, New York, June 8, 1854.

C.

Statement of authorised amounts paid by the treasurer of the United States Military Academy, exhibiting the annual total amounts, the average amounts for two months, together with the average amount applicable for each cadet for all articles, from May 1, 1853, to April 30, 1854.

On what account paid.	May and June.	July and August.	September and October.	November and December.	January and February.	March and April.	Total amount.	Average amount for two months.	Average amount applicable for each cadet for two months.	Remarks.
Band fund	$114 50	$116 37	$116 40	$115 20	$109 08	$104 67	$676 22	$112 70	$0 50	Voluntary subscription by cadets for the support of a band of musicians.
Board at mess commons	3,464 57	3,669 58	3,814 75	4,237 28	4,033 10	3,889 42	23,108 65	3,851 44	16 66	The amount charged each cadet being pro rata, and fixed by a board of officers, who examine and audit the accounts of the purveyor of the cadets' commons.
Washing mess commons	903 31	892 18	938 87	923 40	874 93	831 82	5,354 51	892 42	4 00	$2 per month, winter and summer.
Commissary store	850 10	4,211 23	2,386 00	1,297 93	1,307 44	810 45	10,863 25	1,810 55	7 83	Conducted by the commissary of cadets. Articles furnished, viz: text books, stationery, under garments, equipments, room furniture, oil, candles, &c.
Commissary clothing department.	2,359 74	3,117 84	2,182 57	1,914 09	2,190 57	1,938 50	13,703 31	2,283 89	9 85	Conducted by the commissary of cadets. Articles furnished, viz: uniform clothing, citizens' clothing, and authorized military frock coats for cadets when going on furlough.
Commissary shoemaker's department.	422 75	1,028 63	559 04	516 78	341 97	436 46	3,305 63	550 94	2 37	Shoes and repairs, done by the contractor under the inspection of the commissary of clothing.
Postage	107 46	82 96	104 58	99 45	74 29	101 21	570 65	95 11	40	Postage of letters and newspapers—one newspaper allowed to each cadet, provided he makes application for the permission.
Barber, shoe-blacking, and varnishing.	168 50	195 04	184 80	156 93	148 18	162 23	995 18	165 86	70	This embraces shoe-blacking, hair-cutting, varnishing accoutrements, &c.
Sundries	.....	193 48	.....	.....	.....	.....	193 48	32 24	14	Special permissions.
Baths taken by cadets	140 20	15 50	128 80	122 16	107 85	110 43	619 44	103 24	43	A small charge for each bath, only sufficient to pay the expenses of the bathing establishment.
Dialectic Society	113 25	.....	.....	.....	.....	72 00	185 25	30 88	14	Subscribed by the members of that society, under the sanction of the superintendent of the United States Military Academy.
Iron bedstead and table fund.	27 20	31 60	32 40	31 60	25 20	24 50	172 50	28 75	13	This is only charged to the fourth class for their use, at $20 per month, for the first year only, which is applied to keep the articles in repair.
Rules and triangles, steel	65 57	.....	.....	.....	.....	.....	65 57	10 93	15	A small charge annually being necessary to replace and keep them in repair.
Lithographic department	13 21	.....	.....	22 43	1 18	93 06	129 88	21 64	9	Charge for lithographic works, written by the officers and professors to aid the construction in their several departments.

C—Continued.

On what account paid.	May and June.	July and August.	September and October.	November and December.	January and February.	March and April.	Total amount.	Average amount for two months.	Average amount applicable for each cadet for two months.	Remarks.
Use of cap plates and plumes.	$26 76	.....	.....	.....	.....	.....	$26 76	$4 46	$0 2	An annual charge for plumes and cap ornaments furnished for use of the cadets.
Damages quartermaster's department.	10 70	.....	$1 56	$2 50	$17 73	$0 50	32 99	5 49	2	This embraces damages of barracks, breaking window-glass, &c.
Damages ordnance departm't.	27 04	$7 82	50	6 88	5 19	1 79	49 22	8 20	3	Charge of damages of arms and accoutrements, loss of the same, &c., and which reverts to the United States.
Damages mess commons	8 80	.....	27 74	35 88	30 79	28 04	131 25	21 88	9	Charge of damages of tumblers, plates, dishes, knives and forks, &c., which is signed by the cadets when the said damages are done, agreeably to the regulations of the mess commons.
Making fires, policing barracks, &c.	94 12	106 28	202 44	209 90	218 19	209 24	1,035 17	172 53	73	Distributing fuel, policing barracks, attendance on furnaces. The amount is arranged at each settlement according to the number of cadets at muster, and charged accordingly.
Dentist	177 00	85 27	2 73	.....	255 43	7 29	527 72	87 95	37	For professional services when recommended by the army surgeon of the United States Military Academy.
Dancing master	.....	500 00	.....	.....	.....	.....	500 00	83 34	37	Amount subscribed by the cadets of the United States Military Academy.
Cotillon parties	.....	239 41	.....	.....	.....	.....	239 41	39 90	19	Amount subscribed by the cadets of the United States Military Academy, and given during the months of July and August. This is a voluntary subscription.
Monument to the late Cadet Latham.	255 00	.....	.....	.....	.....	.....	255 00	42 50	20	Subscribed by the members of his class.
India rubber cloak fund.....	56 25	28 00	.....	31 20	.....	.....	115 45	19 24	8	Purchased for the use of the cadets; a small amount charged annually for their use, under the charge of the commissary department.
Cash on account, and sundry subscriptions.	193 08	172 24	4 39	39 90	43 07	17 49	470 17	78 36	31	Subscription to newspapers, &c., &c., which are authorized by the superintendent.
Balance of cash paid cadets..	10,152 34	144 40	116 61	22 02	714 07	326 94	11,476 38	1,912 73	8 23	When graduating they receive the balances due them, including their equipment fund, and the furlough class cadets receive the balance that may be due them to 1st July.
Total	19,751 45	14,827 78	10,778 28	9,785 53	10,493 26	9,166 74	74,803 05	12,467 17	54 03	
Amount received from the government of the United States on account of each cadet, for two months' pay, is.....									48 00	
Difference between his pay for two months, and the amount expended on account of each cadet, which must be liquidated by him either after graduation or from his deposite made on entering the United States Military Academy.....									6 03	

C—Continued.

RECAPITULATION.

Disbursements made by the treasurer of the United States Military Academy on account of cadets, from May 1, 1848, to April 30, 1853—five years.

From May 1, 1848, to April 30, 1849 ...	$17,758 31	$15,600 38	$12,035 00	$11,621 58	$10,883 60	$10,140 43	$78,039 30	$13,006 85	$56 62
From May 1, 1849, to April 30, 1850 ...	17,718 61	14,396 38	10,988 97	9,804 00	9,757 49	8,865 03	71,530 48	11,921 74	55 72
From May 1, 1850, to April 30, 1851 ...	18,308 79	14,928 03	11,627 34	10,588 78	11,016 58	9,371 34	75,840 86	12,640 14	54 73
From May 1, 1851, to April 30, 1852 ...	18,623 82	13,938 86	11,007 74	9,903 41	10,589 04	8,931 67	72,994 54	12,165 76	52 89
From May 1, 1852, to April 30, 1853 ...	17,934 23	14,751 38	12,353 93	11,375 29	11,283 98	9,610 98	77,309 79	12,884 96	53 53
230 cadets—average amount	18,068 75	14,723 00	11,602 59	10,658 61	10,706 13	9,383 91	75,142 99	12,523 83	54 69

Amount of cadets' pay for two months $48 00

Average difference between the pay for two months and the amount expended on account of each cadet..... 6 69

TREASURER'S OFFICE, WEST POINT, *New York, June* 7, 1854.

R. S. SMITH,
Lieut. and Treasurer United States Military Academy.

D.

Balances paid by the Treasurer of the United States Military Academy to the following named cadets, (graduates,) on the final settlement of their accounts, from the year 1848 *to* 1853, *exhibiting five cadets of each class who have received the largest amount, and five who have received the smallest.*

Names.	Amount paid when graduated.	Am'nt deposited when entering, which is included in the preceding.	Amount paid, independent of deposite made.	Am'nt of indebtedness after deducting the deposite made on entering M. A.	Where from.
1848.					
Cadet Dodge, R. H.	$74 29	$10 00	$64 29	.....	Rockford, Surry county, North Carolina.
Michler, N.	147 42	60 00	87 42	.....	Easton, Northampton county, Pennsylvania.
Ogle, C. H.	119 00	25 00	94 00	.....	Somerset, Somerset county, Pennsylvania.
Slaughter, W. N.	161 77	43 50	118 27	.....	Lafayette, Tippecanoe county, Indiana.
Tyler, C. H.	74 38	15 00	59 38	.....	Haymarket, Prince William county, Virginia.
Average.	115 37	30 70	84 67	.....	
1849.					
Cadet Duncan, Thomas T.	72 55	.....	72 55	.....	Findlay, Hancock county, Ohio.
Frazer, J. W.	162 87	105 00	57 87	.....	Holly Springs, Marshall county, Massachusetts.
Holabird, J. B.	146 26	105 00	41 26	.....	North End, Mathews county, Virginia.
Roy, Jas. P.	97 31	34 00	63 31	.....	Canaan, Lancaster county, Virginia.
Park' John G.	104 78	50 00	54 78	.....	Coutsville, Chester county, Pennsylvania.
Average.	116 75	59 00	57 95	.....	

1850.					
Cadet Carlin, W. P.	145 98	55 00	93 98	.....	Carrollton, Greene county, Illinois.
Crispin, Silas	119 09	60 00	51 09	.....	Hamburg, Philadelphia county, Pennsylvania.
Johnson, Robert	121 77	35 00	86 77	.....	Richmond, Henrico county, Virginia.
Magruder, W. F	105 43	54 75	50 68	.....	Bladensburg, Prince George's county, Maryland.
Wyman, P. F	106 34	50 00	56 34	.....	Boston, Suffolk county, Massachusetts.
Average	118 12	50 95	67 77	.....	
1851.					
Cadet Andrews, George	83 35	12 50	70 83	.....	Bridgewater, Plymouth county, Massachusetts.
Gillen, A. A	88 38	14 00	74 38	.....	Gainesboro', Jackson county, Tennessee.
Jones, Rodger	102 60	60 90	41 70	.....	Hamburg, Washington county, District of Columbia.
Piper, Alexander	132 83	50 00	82 83	.....	Franklin, Dauphin county, Pennsylvania,
Thompson, Jas	82 13	20 00	60 13	.....	———, Delaware county, New York.
Average	97 85	31 48	65 97	.....	
1852.					
Cadet Crook, S. W.	173 93	115 00	58 93	.....	Dayton, Montgomery county, Ohio.
Cosby, George B	135 30	50 00	85 30	.....	Louisville, Jefferson county, Kentucky.
Myers, W. J	181 04	50 00	131 04	.....	Reading, Berks county, Pennsylvania.
Todd, John W	154 64	72 00	82 64	.....	Russellville, Logan county, Kentucky
Wood, Charles R	132 71	55 00	77 71	.....	Newark, Licking county, Ohio.
Average	155 52	68 40	87 12	.....	
1853.					
Cadet Chamberlain, B. F	161 28	50 00	110 28	.....	Rochester, Monroe county, New York.
Hunter, R. F	147 03	60 90	86 08	.....	Lancaster, Fairfield county, Ohio.
Livingston, L	121 48	60 00	61 48	.....	Lewis, Essex county, New York.
Shunk, Francis, jr.	100 83	50 00	50 83	.....	Harrisburg, Dauphin county, Pennsylvania.
Webb, Wm. A	118 75	55 00	63 75	.....	Calais, Washington county, Maine.
Average	129 67	55 18	74 48	.....	

D—Continued.

Names.	Amount paid when graduated.	Am't deposited when entering, which is included in the preceding.	Amount paid, independent of deposite made.	Am't of indebtedness after deducting the deposite made on entering M. A.	Where from.
1848.					
Cadet Jackson, Thomas, jr.	$121 00	$75 00	$46 00	.....	Abbeville court-house, South Carolina.
McLean, N. H.	87 28	50 00	37 28	.....	Cincinnati, Hamilton county, Ohio.
Rhett, Thomas, jr.	118 70	100 00	18 70	.....	Haverell, Beaufort county, South Carolina.
Roys, Rufus A.	75 00	98 00	.....	$23 00	Haverell, Grafton county, New Hampshire.
Talmadge, Greer	109 00	75 00	4 00	.....	Poughkeepsie, Dutchess county, New York.
Average	102 19	79 60	33 99	23 00	
1849.					
Cadet Benet, T. V.	84 13	110 75	.....	26 62	St. Augustine, St. John's county, Florida.
Haines, Thomas J.	26 14	16 12	10 02	.....	Portsmouth, Rockingham county, North Carolina.
Robinson, B.	114 57	105 00	9 57	.....	Wilkinsonville, Amelia county, Virginia.
Washington, T. A.	101 96	94 49	7 47	.....	Charleston, Jefferson county, Virginia.
Williams, Thomas G.	76 44	100 00	.....	23 56	Richmond, Henrico county, Virginia.
Average	80 64	85 27	9 02	25 09	
1850.					
Cadet Bankhead, C. H.	88 37	60 00	28 37	.....	Station of his father.
Maxwell, E. J.	101 23	117 00	.....	15 77	Athens, Clark county, Georgia.
Searle, T. S.	96 14	60 00	36 14	.....	New York, New York county, New York.
Walker, L. M.	82 16	73 00	9 16	.....	Columbia, Maury county, Tennessee.

Winder, H. C.	82 45	73 00	9 45	.....	Easton, Talbot county, Maryland.
Average	90 07	76 60	20 78	15 77	
1851.					
Cadet Day, Edward	63 02	100 00	.....	36 98	Jackson, Madison county, Tennessee.
Garrard, R.	67 11	63 00	4 11	.....	Alexandria, Alexandria county, Virginia.
Kelton, J. C.	36 45	75 00	.....	38 59	Lancaster, Lancaster county, Pennsylvania.
Williams, Robert	9 29	68 00	.....	58 71	Fairfax, Culpepper county, Virginia.
Walker, W. T.	82 40	65 00	17 40	.....	Kingston, Roane county, Tennessee.
Average	51 64	74 20	10 75	44 75	
1852.					
Cadet Bonaparte, N. J.	142 87	100 00	42 87	.....	Baltimore, Baltimore county, Maryland.
Bagly, A. P.	71 24	75 00	.....	3 76	Tuscaloosa, Tuscaloosa county, Alabama.
Stockton, Philip	98 99	100 00	.....	1 01	Long Branch, Monmouth county, New Jersey.
Polk, M. T.	104 54	76 00	28 54	.....	Morgantown, Burke county, North Carolina.
Thomas, R. P.	62 81	70 00	.....	7 19	New Orleans, Orleans county, Louisiana.
Average	96 09	84 20	35 70	3 98	
1853.					
Cadet Allston, Benjamin	108 00	65 00	43 00	.....	Georgetown, South Carolina.
Chambloss, R. C.	93 59	100 00	.....	6 41	Hicksford, Greenville county, Virginia.
Otis, Elmore	72 01	39 00	33 01	.....	Huntington, Lorain county, Ohio.
Pelouse, L. M.	88 17	60 00	28 17	.....	Philadelphia, Philadelphia county, Pennsylvania.
Walker, H. W.	66 18	100 00	.....	33 82	Littletown, Surry county, Virginia.
Average	85 18	72 80	34 72	20 11	

D—Continued.

Recapitulation of five cadets of each class who have received the largest amount.

	Amount paid when graduated.	Am'nt deposited when entering, which is included in the preceding.	Amount paid, independent of deposite made.	Am'nt of indebtedness after deducting the deposite made on entering M. A.
Graduates—Year.....1848	$115 37	$30 70	$84 67	.....
Do.....do.....1849	116 75	59 00	57 95	.....
Do.....do.....1850	118 12	50 95	67 77	.....
Do.....do.....1851	97 85	31 48	65 97	.....
Do.....do.....1852	155 52	68 40	87 12	.....
Do.....do.....1853	129 67	55 18	74 48	.....
Average.....	122 21	49 28	72 97	.....

Recapitulation of five cadets of each class who have received the smallest amount.

	Amount paid when graduated.	Am'nt deposited when entering, which is included in the preceding.	Amount paid, independent of deposite made.	Am'nt of indebtedness after deducting the deposite made on entering M. A.
Graduates—Year.....1848	$102 19	$79 60	$33 99	$23 00
Do.....do.....1849	80 64	85 27	9 02	25 09
Do.....do.....1850	90 07	76 60	20 78	15 77
Do.....do.....1851	51 64	74 20	10 75	44 79
Do.....do.....1852	66 09	84 20	35 70	3 98
Do.....do.....1843	85 58	72 80	34 72	20 11
Total average.....	84 37	78 77	24 16	22 12

R. S. SMITH,
Lieut. and Treasurer U. S. M. A.

TREASURER'S OFFICE, WEST POINT,
New York, June 14, 1854.

E.

AN ACT making appropriations for the support of the Military Academy for the year ending the 30th of June, 1855.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and the same are hereby, appropriated, out of any money in the treasury not otherwise appropriated, for the support of the Military Academy for the year ending the 30th of June, 1855:

For pay of officers, instructors, cadets, and musicians	$88,266
For commutation of subsistence	2,190
For forage of officers' horses	960
For general repairs and improvements of academic buildings, abrracks, mess-rooms, officers' quarters, stables, roads, fences, parade and drill grounds, miscellaneous and incidental expenses, fuel, forage, and departments of instruction	29,725
For gradual increase and expense of library	1,000
For expenses of the board of visitors	3,000
For forage for artillery and cavalry horses	8,640
For enlarging and improving hospital of cadets	6,500
For cavalry exercise hall	20,000
For replacing dead and worn-out cavalry and artillery horses	1,000
	161,281

SEC. 2. *And be it further enacted*, That the compensation of master of the sword be $1,200 per annum.

Approved May 10, 1854.

REPORT OF THE COMMITTEE ON POLICE TO THE BOARD OF VISITORS.

WEST POINT, N. Y., *June* 12, 1854.

The committee to whom was referred the matters connected with the police at the Military Academy and post at West Point respectfully beg leave to report:

That they have had the subjects properly coming before them under consideration, and find but few suggestions to make as to any changes or modifications that have not been previously urged and already provided for. When the improvements shall have been made in the extension of the accommodations of the cadet's hospital, and the erection of a new riding hall and stables for the horses, for which objects, it is understood, provision has been made by a recent act of Congress, some of the inconveniences heretofore often complained of will be removed. The committee would earnestly recommend that some increase of comfort and convenience be given to the residences of the different professors and assistants, by additions to the buildings, which the exigencies of their families have long demanded. In conformity with a recommendation by the able and accomplished superintendent, the committee feel that

it is their duty to point out the necessity of erecting a new set of buildings, for the quarters of the unmarried officers and those having small families connected with the Military Academy. Those now occupied by them are almost indispensably needed for the accommodation of the cadets.

The small additional expense required for these improvements will be amply compensated to the government and to the country, by securing, continually, the voluntary and cheerful service of those most competent to render it in the various departments; and it is deemed but just to those who devote their time, talents and energies to the business of teaching in this important national institution.

In the new barrack for the cadets every arrangement appears to have been made that could be desired. The rooms and furniture, dormitories and bedding are convenient and well adapted. The mess hall is spacious and commodious, and although some complaints have been heard among the cadets, the provisions furnished are believed to be abundant, wholesome, and generally well prepared. The baths for the officers and cadets, though, perhaps, not sufficiently numerous, nor at all times amply supplied with water, afford to all an opportunity of preserving those habits of cleanliness and neatness of person so necessary to the preservation of health and promotive of purity of mind.

In making their examinations into the condition and management of the hospitals, the committee had every facility afforded them by the eminent surgeon, Doctor Cuyler, and his very intelligent assistant, Doctor Barnes, and were indebted to them for important suggestions and information. The cadets' hospital was found to be in excellent order, but not sufficiently extensive to accommodate at all times all of the patients. There is, moreover, a great deficiency of bedsteads and other suitable furniture. In order to supply this need and to keep at the hospital a sufficient amount of proper articles of diet for the patients, the committee are forcibly impressed with the necessity of a small annual appropriation by Congress.

The hospital for the enlisted soldiers at this post is very complete, and every necessity appears to be amply provided. It is, in fact, a model establishment. The quarters for the dragoons, though exhibiting the same attention to order and neatness so generally to be met with at this place, are not sufficiently extensive—the men being entirely too much crowded in their sleeping apartments for health or comfort, and this defect should be speedily remedied.

The committee have had every facility for making their investigations offered by the superintendent and other officers, and heartily approve the general system of police regulations that have been adopted. The healthful and fine appearance of the cadets and others shew the benefits resulting from the sanitary rules that have been established. The prohibition of the use of all intoxicating drinks, and of tobacco, in all its forms, if vigorously enforced, will be found not to be the least important means adopted to preserve the health, morals and good deportment of the young gentlemen connected with the institution.

Your committee are pleased to mark the appearance of order and neatness maintained, generally, in the public buildings and grounds, and to observe that improvements in the latter are now in progress, under

the direction of the superintendent, which will greatly beautify the campus, and render it a more suitable field for the various exercises of the cadets.

Finally, your committee are highly gratified in finding every requisite here combined to render the alumni of the academy, by the soldier-like, manly bearing, and general intelligence which characterise them, useful members of society, ornaments to their respective families, and an honor to their country.

WM. W. LEA,
GEO. HOLTZBECHER,
L. B. DICKERSON.

REPORT OF THE COMMITTEE ON INSTRUCTION.

UNITED STATES MILITARY ACADEMY,
West Point, N. Y., June 12, 1854.

The undersigned, appointed a committee to examine and report upon the general course of instruction in the United States Military Academy, respectfully submit the following as their report. They have attended to their duty as well as the time allowed them would permit; to gain as perfect a knowledge as possible, your committee not only listened to the various examinations of classes by the different professors and their assistants, but they visited the section rooms, and observed the recitations, conducted by the instructors. And they are highly impressed with their learning and skill, no less than with their success in imparting knowledge to their pupils. The instructors and their assistants seem, in an eminent degree, to command the confidence of the corps of cadets; making them feel able to learn any thing required of them, and also sure of finding a valuable assistant and friend in their toilsome pursuit. The gentlemen of the corps of instruction need no compliment from us, for they are known by the country to be at the head of their respective departments; and it is no small commendation of the utility of the Military Academy to say that these, with but three or four exceptions, are graduates of the academy.

Your committee have been pleased with the general method of instruction—designed, as it appears to be, to secure, at once, those important objects of education: *thoroughness* and *completeness*.

To attain these objects, the several classes of cadets are subdivided into recitation sections, no one of which contains more than fourteen, and which average about ten members. To each of these sections a time for recitation is allowed, never less than one hour; and in mathematics, engineering, and natural philosophy, the recitation continues one hour and a half. This affords the professor or instructor ample opportunity to question every cadet minutely; to impart to him clear ideas if he is confused; and to drill him thoroughly at the blackboard. We hesitate not to say, that no other institution in our land, within our knowledge, affords such facilities for perfect drill and complete instruction as this. The practice of training students to the daily use of the chalk and the blackboard cannot be too highly commended; and your committee were gratified to find that, on every topic, the student is re-

quired to use these implements, which any intelligent teacher would prefer to text-books, if one or the other must be discarded. When a scholar is sent to the blackboard, with no assistance except a rule and a bit of chalk, and is required to construct a diagram, for demonstrating a principle in mathematics, or for illustrating the construction of a fort, a field-work, or bridge, or a building in engineering; or when he is thus to work out a difficult problem, or to make an analysis of a topic discussed in a treatise on ethics, he is thrown upon the resources of his own mind, and is compelled, as in the after duties of life he will be, to decide and act independently. Besides this, some very great practical results grow out of the use of the blackboard. The eye is trained to accurate measurement of distances and proportions; the hand is rendered skilful in executing all the varied motions necessary to drawn lines, straight and curved, and to combine these together with angles, lights, and shadows, in such ways as to present, on a plain surface, the exact representation of a complicated machine. The mind itself, by this exercise, gains a new power over its thoughts, and becomes disciplined and strengthened for every practical work. The gentlemen of the Academic Board certainly deserve great credit for the perfection to which they have brought this system of blackboard exercise.

Your committee, on learning the extent of the course which the cadets are required to pursue, have been absolutely astonished to find how thoroughly they are made to master it all. No minute point, in theory or in application, seems to have been neglected in the instructions they have received; and scarcely a thing seemed, by their examination, to have been forgotten. This very desirable result could only have been accomplished by laborious and systematic study, in the solitude of the cadet's room, and by the most rigid and critical questioning and cross-examination, by the instructor, in the section room; accompanied, as it must have been, by drill and demonstration at the blackboard, and by constant and judicious review of the topics previously discussed. In addition to this, the instructors, by means of the small number of pupils brought into the section at once, and the large amount of time devoted to each recitation, are enabled to devote a large amount of personal attention to every student. This is, at once, more laborious, and more trying to the patience of the teacher; but, at the same time, is highly profitable to the student and to the country which he is to serve. This special attention to every cadet's difficulties and wants may, in part, account for both the thoroughness and extent of the education which he acquires in the Military Academy. But there can not be a doubt that health and vigor of body are derived from the various physical exercies—the drills in infantry tactics, and evolutions in cavalry practice—in artillery manœuvres—in fencing, in bathing, and in those abstemious habits which must be observed in regard to tobacco and alcoholic drinks—and that each and all of these materially contribute to confirm and promote mental health, and, consequently, not only aid the cadets to endure this prodigious amount of intellectual labor, but actually sharpen his faculties, and give a quickness of perception and a strength of thought never attained by the slovenly or the dissolute.

While your committee have been impressed with the idea that an extraordinary amount of study, considering the time devoted to a course in the academy, is performed, and that thoroughly, they are neverthe-

less well persuaded that a few topics ought to be added. They can conceive but three modes of accomplishing this: one, by requiring a higher preparation as a condition of admission; but this would, by leaving the cadets to study a portion of the course under different teachers, bring them to the academy, in many cases, badly taught on the elements. Another way would be to extend the time of the course to five years; a very wise suggestion as seems, and one almost annually made; and yet never tried as an experiment. A third course, and many may think it most practicable, would be to establish a preparatory school, from which youth might be transferred to the academy proper, while others, having qualifications similar to those trained in the preparatory school, might be at once admitted to the academy.

The committee, although it may be found impossible to comply with the suggestion, could not consistently discharge their duty without saying that in their opinion some practical instruction ought to be given in elocution. In several cases young men lost very much credit for good recitations by an indistinct and confused manner of enunciation. Any person who expects to command others, and exert a great influence over them, ought to be able to speak well and gracefully, clearly and without hesitation.

The subject of history is not taught in the academy, very much to our regret, as it is certainly a branch of great importance, especially the history of our country and military history—this should not be neglected.

The same might be said of political economy, a topic upon which every officer, whose duty is to direct the movements or employments of others, and to provide the means for their subsistence, should have reflected very diligently.

Similar remarks might be made in reference to the study of physiology. Men who are daily called upon to impose burdens of duty or hardship on others, and to care, at the same time, for their health and comfort, ought to be instructed in regard to the human constitution, its powers of endurance, and the laws of its healthful action and preservation.

Only one other remark remains to be made in reference to the thorough study of the English language. This should, by no means, be overlooked, in its higher branches, as rhetoric, or in that more common and more difficult one, higher English grammar; each of which your committee think command too little attention. No young man can lose time and waste labor in the diligent cultivation of an acquaintance with all the rules of instruction, and arrangement of the words and sentences of his mother-tongue. In several instances the cadets showed a carelessness as to both the selection, words, and the construction of sentences, at the examination, which, we are confident, would hardly have been tolerated by their accurate teachers in the section room, and which clearly proves the necessity for a rigid drill upon the nature and structure of the terse Anglo-Saxon language.

In conclusion, the committee beg leave to congratulate the nation on the general success which attends the labors of the instructors in the Military Academy. The grade and amount of instruction is believed to be as large as in any college in the land, and certainly the thorough-

ness with which that instruction is imparted cannot be excelled. The moral government and discipline are such as to secure prompt and quiet obedience to the constituted authorities, and to prepare young men first to submit to law, and hence to command with dignity and energy.

Respectfully submitted,

ROBERT ALLYN,
JOHN J. MORRISON,
Committee on Instruction.

To the BOARD OF VISITORS
of the U. S. Military Academy.

REPORT OF THE COMMITTEE ON DISCIPLINE.

WEST POINT, *June* 14, 1854.

The committee on discipline submit the following report:

Clear evidences of the strict discipline maintained in the military academy at this point have for the past two weeks come under the daily observations of the board. General order and system are apparent, and at once attract the attention of the stranger. Your committee, however, are glad to state that a careful examination into the more private departments of the institution but confirms this just impression. Indeed, if the printed regulations as furnished the board be enforced, the result could hardly be otherwise. That they are enforced, free conversation with the officers and cadets has satisfied us. Little more, therefore, is necessary in this report than to refer to these regulations. To give them in detail would be useless. The superintendent, in reply to a note from your committee requesting any suggestions he deemed advisable, stated that the systems of discipline as laid down in the regulations answers the purposes of the academy.

The two more prominent features of this system are, first, that it teaches the cadet subordination; and, second, the value of time.

No man is competent to command who is incompetent to obey. Prompt obedience to a lawful order is as essential to a good soldier and citizen as it is becoming the gentleman. And as it is a lesson hard for our American youth to learn, so is it a lesson rigidly to be taught. Indeed, several of the rules of the academy seem to recognize this idea, such, for instance, as that which requires "all persons of whatever rank to observe the greatest respect towards sentinels and cadets on post." In short, the entire police and discipline of the academy tend to teach the cadet that he has certain duties to perform, that no duty can be performed by an association of men without order, and, therefore, that it is honorable to obey.

The value of time, too, is most thoroughly shown the cadet. From five o'clock in the morning until ten o'clock at night, he may be said to be on duty; for the hours of relaxation are prescribed, and as much to be observed as the hours of drill and study. If the four years spent here resulted in nothing but fixed habits of employing the time they would be well spent. Without system in this respect men seldom

accomplish much. The wisdom of the rules on this subject cannot be over-rated. To rise early and to retire early, so far as your committee are informed, are taught at West Point alone of our institutions. The cadets are required not simply to be in their rooms at ten o'clock at night, but to be in bed. The happy effects of this discipline are to be seen in the cheerfulness and vigorous health of the cadets, as also in their high average scholarship. And perhaps it is a singular fact, that in many cases in low scholarship, and high demerit (if the phrase be allowable) may be traced directly to a spirit of insubordination. As a general rule, mental calibre being equal, good scholarship and discipline will be proportional.

Your committee have examined the system of punishment, and find it to be such as experience has proven most effective. And it may be well to add that when the punishment on account of demerit amounts to dismissal, the decision of the superintendent ought to be final. Instances of the bad effects of a remission of a cadet's sentence by the Secretary of War have occurred. The cadet should know absolutely that the judgment of his instructors and commanders here will not be reversed at Washington, except in cases of the grossest injustice. All of which is respectfully submitted.

JOHN B. HARMON.

To THE BOARD OF VISITORS.

REPORT OF THE COMMITTEE ON ADMINISTRATION.

WEST POINT, *June* 12, 1854.

The committee to whom was referred the duties of enquiring into the administration of the United States Military Academy respectfully submit the following report:

We have, with all the care that the time at our command would permit, considered the organization of the academic and military staff; and it appears to us, that the rules and regulations laid down, and approved by the President for the government of the institution, are well adapted, and if those rules and regulations are strictly complied with and enforced, they seem to us sufficient for the well government of the same, and that they are enforced, so far as under the control of the academic and military staff, we are well satisfied, but that there are errors, as in all human institutions we are forced from the facts we have ascertained to believe.

Your committee find that the requirements of a cadet, to enter the Military Academy, are, that he "must be able to read and write well, and to perform with facility and accuracy the various operations of the four ground rules of arithmetic, of reduction, of simple and compound proportion, and of vulgar and decimal fractions, and to be sixteen years of age, and five feet in height," and that there are from ninety-five to one hundred and thirty cadets annually appointed, of whom, about thirty-five per cent. graduate, and it seems to your committee, that while the course pursued by the government, in the appointment of cadets is continued, that the rate will diminish rather than increase, for your committee are satisfied, from their appearance, that some of the

cadets appointed for the present year are not sixteen years old, and your committee presume they are an average specimen of the annual appointments; and many of them, perhaps, barely able to pass an examination in the rules of arithmetic above named; then how can it be expected that a cadet laboring under those disadvantages, unless he have more than an ordinary mind, can succeed, when his first years' studies at the academy are mathematics, comprising Bourdon's Algebra, Legendre's Geometry and Trigonometry and descriptive Geometry, English studies, including Bullion's Grammar, Blair's Rhetoric, and Morse's Geography, and the French language.

Your committee have ascertained that out of the ninety-six cadets appointed four years ago, there are but forty in the graduating class, the rest, or nearly all of them, having been found deficient during the first and second years, and sent home, or perhaps some of them may have resigned before an examination, which they found they could not pass.

Your committee would therefore recommend that a member of Congress, before he applies to the President for the appointment of a cadet from his congressional district, *be well satisfied that the applicant is a boy of good mind, sixteen years of age and fully five feet in height, and be able to read and write well, and to perform with facility and accuracy the various operations of the four ground rules of arithmetic, of reduction, of simple and compound proportion, and vulgar and decimal fractions*, that the cadet may have the physical strength to perform the duties of a soldier, and the mental faculties to master the studies laid before him; and if the government expect the professors of this institution, to educate men fit for all the varied duties of a soldier's life, it must furnish them with good materials. Your committee would further recommend that the course of studies at the academy be increased from four to five years, and the study of history and the Spanish language be added to the course of studies now pursued; as a want of knowledge in every one who claims the rank of a gentleman, of at least a general knowledge of the history of his own country, admits of no excuse, and that a large number of the officers of the army are now stationed upon the Mexican frontier, which number must be necessarily increased; from our increased and growing relations with Mexico, and their communications with the Mexican officers, either in time of peace or of war, would be very much facilitated by a general knowledge of the Spanish language, and add to the credit and the honor of the country that educated them. And that the Academic Board be authorized and required to classify and arrange the studies so as to promote the best interest of the institution, and that in classifying and arranging the studies the Academic Board have a due regard to the advancement and proficiency of the cadets when they enter the academy.

A correct statement of the public buildings, &c., at West Point is contained in exhibit A, which is hereto annexed and made part of this report.

Your committee, before closing their report, tender their warmest thanks to the academic and military staff, for their prompt, courteous and gentlemanly manner in which they have furnished your committee,

with all the information in relation to the administration of the Military Academy, which has really made the labor of your committee a pleasure.

H. M. KINSEY,
L. B. LUCKIT,
SAMUEL J. BAYARD.

A.

Report of the number and condition, &c., of the public buildings of the United States Military Academy at West Point, N. Y., June, 1854.

QUARTERMASTERS' OFFICE, U. S. ACADEMY,
West Point, N. Y., June 30, 1854.

1. *Cadets' Barracks.*—This is a four story castellated granite building, 360 feet long and 60 wide, with an L or wing to the rear 100 feet long by 60 wide. It contains 176 rooms, 136 of which are cadets' quarters, and are 22 by 14 feet; 40 rooms are occupied partly as officers' quarters, and partly by employés.

2. *Cadets' Guard-house.*—This is a small two-story brick building, in rear of the barracks, in which are the officers of the commandant of cadets, the officer in charge, the cadet adjutant, the guard rooms, fire apparatus, armories and cells.

3. *Academy.*—This is a granite building, with brown stone pilasters, 275 feet long, 75 feet broad, and three stories high. In the first story is the chemical laboratory, 75 by 38 feet, the fencing hall of the same dmensions; at the opposite end and between them, a large room 188 by 65 feet, used at present as a cavalry exercise hall. In the second story are the mineral cabinet and the engineering academy, each 75 by 38 feet; to the latter are attached two model rooms, each 46 by 22 feet. On the same story are twelve recitation rooms 24 by 22 feet. In the third story is the artillery model room 75 by 38 feet; the drawing academy of the same dimensions; to the latter are attached two galleries for pictures and statuary, each 70 by 22 feet; on this story are six other rooms for recitation and instruction.

4. *Mess hall.*—This is a granite building 170 by 64 feet. The centre is one room 100 feet long by 50 broad, and 20 in height, which is the mess room for all the cadets. The north wing is occupied as quarters by the purveyor of cadets, and the south by the mess rooms of the officers stationed at the academy. The kitchen, bakery, &c., are attached in the rear.

5. *Hospital of cadets.*—This is a plain granite house 130 by 40 feet. In the centre are eight wards for the sick, and quarters for the attendants in the basement. The wings are occupied as quarters by the surgeon and assistant surgeon.

6. *Chapel.*—This a granite building 100 by 53 feet, fitted up with pews, &c., for divine worship.

7. *Observatory and library.*—This is a granite building, capped and corniced with brown stone, gothic style. The east wing is the library, 46 feet square and 31 feet high; it contains nearly 1,700 volumes. The centre is the stand for the equatorial telescope, and the corner towers

are occupied by the transit instrument and mural circle. This building also contains the offices of the superintendent, the adjutant, the quartermaster, and the treasurer of the academy.

8. *Artillery laboratory.*—This consists of three two-story granite buildings and an enclosed yard, with shelter for guns.

9. *Hospital for troops.*—This is a two-story brick building, with one large ward, dispensary and steward's room on the first floor, and three wards in the upper story; kitchen, attendants' quarters, &c., in the basement.

10. *Equipments' shed.*—This is a large two-story brick building, 154 feet long and 54 feet wide. It contains the ponton train of the army, and all the equipments, tools, &c., shops, &c., of the engineer service.

11. *Engineer troops' barracks.*—This is a large one-story wooden building 120 by 22 feet, divided into four barrack rooms, with kitchen and mess rooms in the basement. There are also two detached buildings used as quarters, each about twenty feet square.

12. *Post guard-house.*—This is a two-story brick building, the basement of which is occupied by quarters for the engineer troops, and by cells. The first story is divided into quarters for the troops and the guard-room.

13. *Dragoons' barracks.*—This is a wooden building a story and a half high, 30 by 58 feet. The first story is divided into two barrack rooms. In the basement are the kitchen and mess rooms for both artillery and dragoons.

14. *Artillery barracks.*—A building 30 by 47 feet, similar in all respects to No. 13, in the basement of which is the store-room of the subsistence department of the post. Nos. 13 and 14 were built for workshops.

15. *Band barracks.*—These consist of two wooden buildings, one 52 by 108 feet, containing 22 rooms, and the other 43 by 53 feet, containing 10 rooms and a light and dark prison; the former is occupied by 23 men and their families, and the latter by 4 men and their families, or by 12 drummers and fifers.

16. *Cavalry stables.*—These are two stone buildings 155 by 23, and 75 by 23 feet, respectively, with stalls for forty-three horses. There is also a temporary shed which will accommodate 30 horses; the attics of the stone stables are used for storing forage, &c.

17. *Powder magazine.*—This is a fire-proof brick building 100 by 25 feet, surrounded by a brick wall.

18. *The quarters of the officers and professors of the academy.*—These consist of three double stone houses two stories each, five two-story brick buildings, and eight wooden buildings, one of which is in process of construction.

19. *Workshops.*—These consist of a blacksmith's shop and carpenter's shop, with lime-house, and two sheds for lumber, carts, &c.

20. *Commissary of cadets and sutler's store, tailor's shop, &c.*—These are two two-story wooden buildings, occupied as stated.

21. There is also, at the northern end of the post a row of nine small double cottages, built in 1837 for the accommodation of the non-commissioned officers and their families, and for the laundresses of the cadets and troops.

These buildings are all kept in repair by the funds provided under the general head of "repairs and improvements," and are in a good and serviceable state, leaving out of view their inherent defects, such as want of sufficient space, and liability to dampness on account of great variations in temperature. The latter is the case in the stone towers containing the astronomical instruments, while the former inconvenience is felt in the professors' quarters, the cadets' hospital, and in the barracks of the dragoons and artillery.

The larger of the two stables (No. 16) is much out of repair, the side wall having yielded, and requiring props.

To complete the set of buildings required for the institution, Congress has appropriated $6,500 for enlarging the cadets' hospital, $22,000 for building a cavalry exercise hall, and $3,000 for additions to the quarters of officers of the academy.

An additional appropriation of $5,000 was asked for the latter object, as well as $20,000 to commence a building for the accommodation of the officers now quartered in the cadets' barracks, but were not granted. Should the corps of cadets be increased, the rooms now occupied by officers in the barracks would be necessary for cadets. An appropriation of $8,000 has been made for new stables, to complete which an additional sum of $10,000 will be required.

The building proposed for new barracks of dragoons (plans of which have been submitted to Washington) it is estimated will cost $15,000.

The mode of expenditure, and the amount on hand of the funds appropriated for repairs and improvements are stated in the report on that subject from this office.

Respectfully submitted,

R. S. SMITH,
Lieut. and Quartermaster U. S. M. A.

CADETS' HOSPITAL, WEST POINT,
New York, June 12, 1854.

COLONEL: I have the honor to acknowledge the receipt of the enclosed transcript, from the minutes of the board of visitors, through the adjutant.

The enlargement and improvements in contemplation, and soon to be commenced, will doubtless render this hospital sufficiently commodious, and it is to be hoped, in every way convenient and comfortable to the sick. The furniture, as I have on several occasions reported, is insufficient and (what there is remaining yet) unfit for use, being old and worn out.

A small appropriation ($500) for refurnishing the wards, and an annual appropriation of a hundred or two dollars to keep up the furniture, would not only contribute to the convenience and comfort of the sick, but, I think, actually necessary.

The present mode of employing attendants from among the laborers of the garrison for the cadets' hospital is manifestly objectionable. They should be enlisted expressly for the duty.

The health of the corps has been almost uninterrupted—only a few very serious cases of illness having occurred since the adjournment of the last board of visitors.

I am not aware of any sanitary rules being required beyond those already in operation.

The hospital for enlisted men is one of the most comfortable in the army, and is well managed by the medical officer in charge.

I am, sir, very respectfully, your obedient servant,

JNO. M. CUYLER,
Surgeon U. S. A.

Brevet Col. R. E. LEE,
Superintendent Military Academy.

RIVERS AND HARBORS, &c.

The works of this character, in charge of this department, have been prosecuted during the year with vigor and general success. The surveys in hand have, with four or five exceptions, where uncontrolable difficulties intervene, been prosecuted to completion; and projects of improvement, based upon them, have been furnished by the surveying officers for the consideration of Congress.

The works of improvement directed by the law have, most of them, been carried as far as the appropriations would go. A few are still in progress, being of a nature where more rapid advancement could only be effected by unwarrantable expenditures. The work thus far done, though generally incomplete, is, in many cases, affording valuable aid to commercial pursuits. The following instances may be partially enumerated, viz: improvement of Kennebeck river, Bridgeport harbor, Hudson river, New York harbor, the ice harbors of the Delaware, Cape Fear river, Mobile harbor, South West pass of the Mississippi, and Colorado river—together with a number of harbors of refuge along the Atlantic and Gulf coasts, protected or improved. A statement of the progress of operation in each case, follows:

Removing the rocks obstructing the navigation near Falls island, Cobscook bay, Maine.—No one has, as yet, been found willing to undertake this work for the amount of the appropriation. Efforts are still continued, and will be, to induce competent persons to offer for the work.

Breakwater at Owl's-head harbor, or at Rockland harbor, in Maine, as the War Department shall decide.—The delays incident to examining and deciding between the two localities in question, have prevented the commencement of the work to this time.

Balance in treasury, October 1, 1854	$14,800 00
Probable amount to be expended by June 30, 1855	14,800 00

Improving the Kennebeck river, from the United States arsenal wharf, in Augusta, Maine, to Lovejoy's Narrows.—The work was commenced this season by applying a raking apparatus (devised by the officer in charge) that could be gauged to the varying depth of the water. This was suspended between two scows, that were connected by a platform, and towed by a steamer. The trial on Gage shoal has been very successful, removing the sand, gravel, &c., and exposing the large boulders, some of which reach the size of twenty-tons. These boulders have been removed by suitable machinery, and the rake will be set at work again. It is regarded as a most economical and efficient machine.

Breakwater at Richmond Island harbor, Maine.—This work continues in the condition reported last year; there being no funds for continuing it.

Repairing the breakwater in Portland harbor, Maine.—This work remains in the condition reported last year; there being no means for continuing it.

Protection of the Great Brewster island, in the harbor of Boston, Massachusetts.—The section of the sea wall for the protection of this island, put up this year, is 386 feet in length; the total length constructed up to this time, is 1,353 feet; there are yet required to be added to the north wall, 897 feet. The work has now reached to within 150 feet of the most salient point of the northeast head of the island. This head, rising seventy to eighty feet above low water, is rapidly wasting away. Until it shall be reached and protected, the unfinished work will be of little service, and is even exposed to be swept away.

Balance in treasury 1st October, 1854	$6,100 00
Probable amount to be expended by 30th June, 1855	6,100 00

Protection of Lovell's island and sea-wall, on Deer island, Boston harbor, Massachusetts.—The injury to these works is increasing from delay. The engineer in charge estimates that it will now require $1,000 more for their repair than would have sufficed last year.

Survey in reference to the improvement of the harbor of Scituate, in connexion with the North river, Massachusetts.—The survey shows, that by the expenditure of a large sum of money, this position may be made a harbor of refuge for the commerce of Boston, when it would become of national importance.

The surveying officer estimates for the following improvements, as desirable in this point of view: Dredging harbor, $50,000; breakwater, $123,750; canal, $50,000; other expenditures, $26,250. Total, $250,000.

Repairing the injuries done to the government works, on Plymouth beach, in the great storm of 1851.—The closing of operations, the means being exhausted was reported last year. The works, where not repaired last season, are in a state needing attention; but further means are necessary, and for repair of injuries arising from the ordinary action of the elements and the lapse of time.

Preservation of Cape Cod harbor, at or near Provincetown, Massachusetts.—120 acres of barren sand beach to the north and northwest of Provincetown have been covered with transplanted beach grass, and a bulk head of timber 1,151 feet in length has been placed upon Long Point beach. It is believed that these measures will preserve the harbor from the drifting sands.

Preservation of Great Wood's Hole harbor, Massachusetts.—Operations were closed, for want of funds, at the date of last year's report. Nothing has been done since.

Repairing the breakwater at Hyannis harbor, Massachusetts.—The appropriation was exhausted soon after last year's report, since which nothing more has been done. 750 feet of the breakwater still remain uncapped, and consequently in an exposed condition.

Survey of Taunton river and New Bedford harbor, Massachusetts. Taunton river.—A general map of the river with detailed plans of the shoals was prepared from the survey made a year ago. The river is thirteen miles long from its mouth to Taunton, navigable for coasters for four miles up, and at the highest tide for three and-a-half miles further for vessels drawing thirteen feet. Thence to Taunton, five and-a-half miles further, but six feet can be carried, the river becoming narrow and tortuous, and being obstructed by several shoals, composed of gravel and boulders. The plan of improvement proposed by the officer in charge, is, to excavate a channel sixty feet wide, and to the depth, at low water, of four feet, through the several bars and shoals, and to remove some rocks found near the channel. Taunton contains a population of 12,000 people, has a large capital actually employed in manufactures and the coasting trade, exports annually to the value of about three millions dollars, imports largely of breadstuffs, coal and raw materials, and is the centre of a populous manufacturing district.

The survey of New Bedford harbor was completed, and the report presented last year.

Removing obstructions near the mouth of Seekonk river, harbor of Providence, Rhode Island.—The contract for this work has been satisfactorily completed, and 17,000 cubic yards of earth removed from the obstruction of the crook; by which a channel one hundred and fifty feet wide, and nine feet least depth at low water, has been made over a length of two hundred and eighty yards, from Fox's point to the main channel of the river below. The value of the improvement would be much enhanced by the completion of the project. This requires the cut to be widened by an addition of one hundred feet on its western side.

Improvement of the harbor of Bridgeport, Connecticut.—This improvement has been carried as far as the means would admit. A cut one hundred feet wide, with a minimum depth of eight feet at low water, has been made over both the inner and outer bars. Vessels drawing sixteen feet water can now be taken in at high water. 16,756 cubic yards have been removed from the inner and 10,893 from the outer bar.

The whole has been satisfactorily completed by the contractor. To complete this improvement, according to the project, the cuts should be widened to 200 feet.

Removing middle rock, New Haven harbor, Connecticut.—Nothing has been done at this work since last year, when, as then reported, it was abandoned by the contractor.

Balance in treasury, October 1, 1854..... $5,900 00

Continuing the improvement of the navigation of the Hudson River above and below Albany, and not above Troy.—During the past year the operations for the improvement of this river have been confined almost exclusively to removing the obstructions to navigation caused by the various bars which have been formed. In furtherance of this object two, and the latter part of the year three, dredging machines have been at work, which have excavated from the bed of the river, at *nine mile tree bar*, near Castleton, 59,022 cubic yards of solid matter, which has rendered the channel of the uniform depth of eight feet at low water, and they are now at work on *Mull's bar*, having taken up 39,390 cubic yards. Total amount of excavation to September 30, 98,412 cubic yards. During the month of October there have been further excavated at *Mull's bar* 39,366 cubic yards. Very great advantages have been secured to the navigation by the work thus far; it will continue until arrested by ice or freshets.

Balance in treasury, October 1, 1854..... $31,652 14
Probable amount to be expended by June 1, 1855..... 31,652 14

Further improvement of the harbor of New York, by removing the rocks at Hell Gate and Diamond reef, in the East River.—The work was suspended last year, the appropriation being nearly exhausted, since when nothing further has been done.

Removal of the bar at the junction of the Passaic and Hackensack rivers, in Newark bay, New Jersey.—The contractor for this work has removed from the shoalest part of the bar 33,265 cubic yards of earth, on a width of 100 feet, which appears to have produced a decided improvement in the navigation at that point. The work of producing a suitable channel, however, is still unfinished, and the appropriation is exhausted.

Repairing the public work at Little Egg harbor, New Jersey.—It was stated in my report of last year that great changes were wrought on this part of the coast by natural causes that had swept away the former constructions, and that further investigations were necessary before deciding on any process of improvement. Such examination it has not been possible for this department to have made as yet.

Balance in treasury, October 1, 1854..... $8,452 00

Continuation of the Delaware breakwater.—The small appropriation for this work was exhausted at the date of last year's report, since when nothing has been done beyond care of the public property.

Construction of a harbor on the east side of Reedy Island, Port Penn, Delaware.—At the date of last year's report, four piers of the lower line of this harbor were finished and the fifth under way. This fifth was finished, and the piles of the two inner piers of the upper line were driven by Christmas, when the rigor of winter put a stop to work. The harbor, though but partially formed, was of great service to navigation during the season of ice, and all the work, including the unfinished piers, withstood the severe trials of the winter's exposure very satisfactorily. The plan of the structures has proved very suitable to the position; they are not rigid enough to be cut into by the running ice, and admitting the flow of water through them, they produce no disturbance of the currents of the river, or alteration of its bottom. Operations were resumed in April and continued till July, when the appropriation was exhausted. The outer pier of the lower line is completed; number two of the upper line nearly so; number one, next the shore, remain incomplete.

Repairing the piers and improving the harbor of New Castle, Delaware.—The upper hexagonal pier built in 1836, had been injured by ice and vessels running against it and displacing the stone. These were readjusted, the top covered with blocks two feet thick, securely wedged together. A large crib pier for the lower line of the harbor was built in Philadelphia, floated down to the harbor, and sunk and secured in its position in the fall; during the winter it was filled with stone, and completed in all respects by the middle of April last. The winter's experience proved this to be a most serviceable addition to the harbor.

Improvement of the Patapsco river, from Fort McHenry to the mouth of said river.—The steam-dredge constructed under the appropriation for a dredge for the waters of the Chesapeake and Atlantic coast, was put in operation as soon as accepted, on the improvement of this river. The dredge has co-operated with the vessels and apparatus provided by the city of Baltimore for the improvement, and their joint efforts have opened the channel from just below Fort Carroll to opposite the Bodkin light. To complete the improvement within a reasonable period, additional steam-dredges are necessary.

Balance in treasury, October 1, 1854	$16,000
Probable amount to be expended by June 30, 1855	16,000

Removing obstructions at the mouth of the Susquehannah river near Havre de Grace, Maryland.—It having been found impracticable to obtain a dredging machine to effect this improvement, nothing has been done during the year. The appropriation is too small to admit of the purchase of machinery for the work.

Balance in treasury October 1, 1854	$9,900 00

Construction of a steam-dredge, equipment and discharging scows for the waters of the Chesapeake bay and Atlantic coast.—Thedredge and equipment contracted for under this appropriation, was accepted in October last. It was then put in successful operation in the Patapsco river, and is now employed there. It works well.

Balance in treasury, October 1, 1854..... $2,800
Probable amount to be expended by June 30, 1855..... 2,800

Improvement of the James and Appamattox rivers below the cities of Richmond and Petersburg, Virginia. James river.—A steam dredging machine, the property of the city of Richmond has been employed in the improvement of this river since March last. It was put to work on the Warwick bar, and has been steadily employed there since. The amount of excavation effected is 38,556 cubic yards. The obstructions will soon be entirely removed from that shoal.

Appamattox river.—But little progress has been made in the improvement of this river, in consequence of the inefficient action of the contractor, who at length (in June last) abandoned the work. No new arrangement has yet been made for its prosecution. The north channel, opposite Stein's upper cut, has been partly opened, and two wrecks obstructing it have been removed.

Balance in treasury, October 1, 1854..... $21,500
Probable amount to be expended by 30th June, 1855..... 21,500

Survey of the Rappahannock river, Virginia.—This work is in progress, under the direction of the superintendent of the United States coast survey. One general topographical map and three sheets of soundings have been received from the office of that survey.

Balance in treasury, October 1, 1854..... $1,100 00
Probable amount to be expended by June 30, 1855..... 1,100 00

Reopening a communication between Albemarle Sound, North Carolina, and the Atlantic ocean, by the construction of a breakwater across Cavatan Sound.—The law prescribing a breakwater as the exclusive mode of effecting this improvement, the work, as stated last year, is deferred, until legislative action can be had, removing the restriction as to the means, it being the opinion of the engineer in charge that the construction of a breakwater, if not prejudicial, would, at any rate, be quite useless, for the desired improvement.

Balance in treasury, October 1, 1854..... $49,700 00

Completing the improvement of Washington harbor, North Carolina.—This improvement has been continued during the past year, and is expected to be soon completed with the funds in hand.

Improving Cape Fear river, North Carolina, at or near its communication with the ocean.—The jetty commenced for the protection of Bald Head in August, 1853, has been carried out 300 feet beyond the original high-water line. It has had all the effect anticipated; has caused a large accumulation of sand, and will, probably, with some subsidiary works now partly constructed, continue to afford the desired protection In March last, preparations were commenced for closing the three open.

ings south of New Inlet, by means of breakwaters of granite and logs. Temporary quarters and work shops have been erected; an excellent wharf built on the north side of Zeak's island; and a railroad constructed from the wharf along Zeak's island, towards the inlets to be closed. This road, running much of the way over water, is very costly, but is indispensable to the work. The preparations for receiving stone rapidly are nearly complete; so that the officer in charge reports that he can apply $100,000 to the work, the next year, advantageously.

Balance in treasury, October 1, 1854	$125,000 00
Probable amount to be expended to June 30, 1855	100,000 00

Survey of the harbor of Georgetown, South Carolina.—This survey was executed under the auspices of the Coast Survey. There are four channels leading into the harbor. The main ship channel, the southeast pass, the new channel, and the Point channel. The first three have about seven feet water; at low water the last is constantly changing, and is unreliable. The tide runs four and a half feet. The main ship-channel has changed in position, within a few years, to the south and west. The southeast pass is more direct than the main ship channel, and is preferred by navigators. The new channel offers the shortest passage to the ocean, and is thought to be improving in depth. This tendency might be aided by a jetty at right angles to the shore line of North Island, from a point near its southern end. Such a work, however, would be of great extent, and could only be constructed by a heavy outlay.

Improvement of the harbor of Charleston, South Carolina.—The large and powerful vessel designed for this service arrived at Charleston after some delay; and the good quality of the hull and machinery having been ascertained, some experiments have since been made with her, to test her capacity and suitableness for dredging in the exposed situation where she is required to work; accidents have occurred which have prevented the experiments being continued long enough to furnish the data for a fair estimate of her abilities; it is supposed further trials will be made, and if these give satisfactory results, the vessel will be set at work on the contemplated improvement.

Balance in Treasury, October 1, 1854	$42,600 00
Probable amount to be expended by June 30, 1855	42,600 00

Dike to Drunken Dick Shoal, Charleston harbor, South Carolina.—This work is suspended during the operations of the proposed channel in its vicinity.

Removal of obstructions in the Savannah river, at a place called The Wrecks, and the improvement of the navigation of said river.—The operations, so far, have consisted in deepening and widening the channel at The Wrecks, and over the Garden bank, and in partly closing the Fig island channel with a double row of piling. The dredging operations have effected a channel of 300 feet wide over The Wrecks, and have increased the width at Garden bank by 75 feet. Fig island channel has been closed

to within 275 feet of Hutchinson's island, and the ebb tide is thus, in a measure, confined to the Front river. The storm of the 8th and 9th of September backed up the water 3 or 4 feet above the piling of this dam, and floated off large amounts of timber from up the river, which coming down with the current, and drifting against the piling, finally lifted about 50 feet of it, and carried it off. The whole injury done to the improvement by the storm is estimated at $6,000. The appropriation made by Congress is exhausted, and the city of Savannah has expended about $40,000, in addition, on the works. The officer in charge estimates for $80,000, as a proper sum for this year's operations.

Survey of the river Ockmulgee, Georgia.—This survey was commenced last February, and prosecuted until April, with the prospect of its completion during that month; but it became necessary to call the officer in charge to meet a commission to study the improvement of the St. John's river, Florida, which work was also in his care, and thence he has since been necessarily removed to Savannah and Charleston, where he has been so engaged that it has not been possible to complete the survey to this time.

Survey of the river Savannah, from Savannah to Augusta, Georgia.—The survey is completed, and maps of the river, showing its general courses and distances, with the character of the bordering country, have been prepared, as likewise charts, on a larger scale, of the shoals and bars, with ample series of soundings. With the aid of these, the question of improvement has been studied and a project with estimates has been prepared.

Repairs of sea-wall, St. Augustine, Florida.—The necessary repairs have been completed. They consist of pointing open joints; filling large cavities in the wall with fine concrete; and underlaying the foundation to the extent of 300 or 400 feet with new work, where the lash of the sea had exposed and injured the work. A small balance remains in hand applicable to future injuries.

Filling in behind the United States sea-wall, in the harbor of St. Augustine, Florida.—The appropriation for this purpose has enabled the filling to be brought up to within two feet of the top of the wall—the tide is now excluded. For the present the completion of the filling may be deferred.

Improvement of the river St. John's, Florida.—The commission assembled to deliberate on this improvement recommended that, in the first place, an accurate survey of the river as far up as Jacksonville should be obtained. Arrangements for making this survey have been entered into with the Coast Survey, by which the work will be commenced this fall.

Balance in treasury October 1, 1854.....$7,938 55

Connecting the waters of the Indian river and Mosquetto lagoon at the Haulover, Florida.—These waters have been connected by a suitable

canal according to the contract made therefor. The canal should be extended into the lagoon, to prevent its mouth from shoaling up.

Improvement of the harbor at Mobile, Alabama, at Dog river bar, and the Choctaw Pass.—The appropriation for this work has been applied to the construction of a dredging vessel, with four attendant scows, and to dredging operations at Dog river bar. The apparatus was received the latter part of March, and after some time bestowed upon remedying defects, strengthening the machinery and fixtures, and organizing the force, work was commenced on the 1st May. It was determined to begin by opening a cut of 100 feet wide to a depth of ten feet, at Dog river bar, to be afterwards deepened and widened. In May, June, July and August, 32,000 cubic yards of matter was removed. It was then found necessary to have the bottom of the dredge and scows covered with a protection against the marine worms, which were becoming troublesome, in consequence of the protracted drought allowing the sea-water to come up the bay. For this purpose the vessel and scows have been taken up to Mobile, where they are now receiving the requisite protection and repairs. When these are effected the work of dredging will be resumed. For continuing the work, the officer in charge asks a grant of $100,000, for the next year, which will be applied to opening a cut of 12 feet deep through the two shoals, direct to the city—this to be widened to 300 feet, with the aid of another appropriation.

Balance in treasury, October 1, 1854.....$9,963 62
Probable amount to be expended by June 30, 1855..... 9,963 62

Survey of the east Pascagoula river, Mississippi.—The survey of this entrance makes it probable that no permanent channel can be opened through the sandy bars at the entrance; a temporary opening affording six feet of water, with a width of 100 feet, would cost about $6,600,

Balance in treasury, October 1, 1854.....$4,000 00

Construction of a harbor on Lake Pontchartrain, near the city of New Orleans.—The section of this work, 1,500 feet long, commenced in July 1853, is still in progress, having been delayed by storms and sickness. It may be expected to be finished in November.

Balance in treasury, October 1, 1854.....$13,000 00
Probable amount to be expended by June 30, 1855..... 13,000 00

Opening a ship channel of sufficient capacity to accommodate the wants of commerce through the most convenient pass leading from the Mississippi river into the Gulf of Mexico.—From the nature and condition of the river, this channel, reported finished last year, is, as was anticipated, gradually filling up, and without the aid of annual repairs it will soon revert to its natural condition.

Brazos river.—The survey of this river has been completed—the requisite improvements are estimated to cost $44,000.

Improvement of the navigation of the Colorado river, Texas.—The vessel formerly employed for this purpose, having been purchased and repaired by the government, was set to work in November last. Instead of removing the raft and opening the navigation of the main river, for which the appropriation was inadequate, a lateral channel through a series of lakes was commenced, and the work having been vigorously prosecuted during the winter, it proved entirely successful, so that in March a boat was passed through. The new channel is reported to be steadily improving, and has already been of much utility. A number of cotton boats have passed through, as well as two steamboats, one of which has made several trips loaded.

WASHINGTON AQUEDUCT.

Supply of water for the cities of Washington and Georgetown.—The lands for the line from the Great Falls to the district boundary have been condemned, under a law passed by Maryland.

Quarries for the cut stone for the bridges, &c.. and of rough stone for the dam, have been purchased, with a site for the Virginia abutment, that State having passed a law giving its consent.

Quarters, workshops, and other houses at the Falls, have been erected; derricks and other machinery prepared; a careful final location of the line has been completed; and the line prepared for letting the grading out by contract. A contract for the supply of bricks has been made.

The first three tunnels have been begun, and about 450 feet of them completed; a small portion of the brick conduit has been built, and a large portion of the line near the falls has been excavated, and the foundation prepared for the masonry.

The river has been gauged at a very low stage, and the quantity of water flowing in it ascertained to be more than thirteen times the quantity needed for the aqueduct.

Estimate of amount required to be appropriated for the fiscal year ending June 30, 1856.....$1,000,000 00

All of which is respectfully submitted,

JOSEPH G. TOTTEN,

Brevet Brigadier General Topographical Engineers.

REPORT OF THE COLONEL OF TOPOGRAPHICAL ENGINEERS.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, November 11, 1854.

SIR: I have the honor to submit the annual report of this bureau. Considering it would be more satisfactory, as exhibiting more matter in detail, I have subjoined copies of the annual reports of the several officers in the actual command or direction of operations in the field. I have therefore subjoined to this report as an appendix—

1. The report of Capt. J. N. Macomb, in relation to the survey of the lakes, appendix A.

2. The report of Brevet Col. Turnbull, in relation to works on Lake Champlain, works on Lake Ontario, and the harbors of Buffalo, Dunkirk and Erie on Lake Erie, appendix B.

3. All other works on Lake Erie, being the annual report of Capt. Stansbury, appendix C.

4. Works on Lake Michigan and Lake St. Clair, being the report of Brevet Lieut. Colonel Graham, appendix D. [Not yet received at this Bureau.]

5. The annual report of Brevet Lieut. Colonel Johnston in relation to the western rivers, appendix E.

Appendix F. embraces the various reports of the Board of Engineers, subsequent to the annual report of last year.

In a former report I referred to the measurement of a base line for the survey of the lakes by Capt. Thomas J. Lee. His report of that duty will be found as appendix G.

The information possessed in this office in relation to the Florida canal survey will be found in appendix H.

And Capt. Simpson's report of the Minnesota roads will be found as appendix I.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Col. Corps Topographical Engineers.

Hon. JEFFERSON DAVIS,
Secretary of War.

APPENDIX A.

ANNUAL REPORT ON THE SURVEY OF THE NORTH AND NORTHWESTERN LAKES.

MACKINAC, MICHIGAN, *October* 9, 1854.

SIR: For the information of the Bureau of Topographical Engineers, I have the honor to present the following account of the operations of the force under my command during the time which has elapsed since I made my last annual report. In accordance with orders received

from the bureau, I left the headquarters of the survey very soon after following the parties in from the field in October last, and repaired to Washington city to attend to the settlement of my accounts and to some of the general duties of the survey, which employed me at the bureau for about three months. During my absence from the office in Detroit the officers and assistants of the work were engaged under the immediate supervision of Captain E. P. Scammon, topographical engineers, in making the computations and drawings appertaining to their respective subdivisions of the survey.

During the month of January my force was diminished by detaching Lieut. Mendell, topographical engineers, who was assigned to duty in the "Department of the Pacific." His place has not yet been supplied.

In the month of February I made application to the bureau for authority to employ a computer and draughtsman qualified to prepare some of our work for the engraver. My application having been approved by the War Department, I succeeded in securing the services of Mr. A. Boschke, who joined me in Detroit early in April, and at once began the projection and the reductions from our detail maps, for the chart of the Straits of Mackinac, now in the hands of the engraver. The operations of the draughtsman subjected the work to new tests which afforded gratifying proof of its accuracy.

In the month of May Captain Scammon, having fitted out a large party for the purpose, resumed his duties in the field, and continued the survey of the St. Mary's river, to which he had been assigned by me, with the approbation of the bureau, on his return from duty in Florida in the preceding year. His first duty in the spring was to mark out the channel near the west shore of the East Neebish reach of the river, and thus render available at once to the navigation one of the important results developed by his work of last year. This was done by a system of land-marks devised for the particular locality in question by Captain Scammon and myself, and it has been pronounced by those who navigate there to be the best plan of marking a channel that has yet been practised upon these waters. A sketch of this navigation has recently been engraved and published by the bureau. Captain Scammon has recently gone in from the field with voluminous notes and sketches, having completed the survey of the river, from Lake Huron to the Saut St. Mary. The interest in this field is now greatly increased among all concerned in the commerce and navigation of the lakes by the expected opening of the ship canal to Lake Superior; but it is to be apprehended that some delay must necessarily arise in the publication of the results of the river survey, in consequence of the orders which have lately been received detaching from the survey of the lakes the officer in whose charge that subdivision of the work was carried on.

The party in charge of First Lieut. W. F. Raynolds, topographical engineers, also took the field in the month of May, and resumed operations at the western limits of last season's work, and extended the survey over the northern section of the Beaver island group, embracing a very extensive field of hydrography, in which the party suffered many interruptions from the exposed situation of the field. In the month of September this party relinquished the survey of the Beaver

islands, and was placed by me upon the north coast of Lake Michigan, to carry on the shore-line work and the hydrography of that coast, under the immediate charge of Assistant Lamson, Lieutenant Raynolds having been previously directed to commence a series of observations for lunar culminations, &c., at the astronomical station on Round island, near Mackinac.

The movement to the north coast was made for the purpose of avoiding the boisterous weather of the fall about the islands, and with a view of pushing forward the work to the westward in as compact a form as possible.

The following is an account of the operations of the subdivision in my immediate direction, assisted by Lieut. G. W. Rose, topographical engineers. The steamer Surveyor having been fitted out in May, we spent the first three days of June in the survey of a reef in the west end of Lake Erie, which was not discovered at the time of making the general survey of that section. This additional information was duly reported to the bureau, and an account of it published in the newspapers at the time; the result will appear in the future editions of our chart of that lake. After paying the accounts in Detroit for supplies of our parties, I repaired to the Straits of Mackinac, by the middle of June, where my first duty was to extend the line of survey of the south coast, with the in-shore soundings, some five miles, as required towards the proper filling up of the chart of that section of the survey. In the course of the season three other detached pieces of work, beyond the reach of the shore parties, were executed by us towards the same object; two of these were surveys of reefs heretofore discovered by my party in the steamer Surveyor, and the third was the survey of a reef of great extent in the middle of the western section of the straits, which was discovered by us this season. It is now confidently believed that every such danger within the limits of the chart we are about to put forth has been thoroughly surveyed; it is certainly to be hoped so, for we have already laid down no less than thirteen detached reefs, shoal enough to "fetch up" any of the craft usually engaged in the lake navigation. These reefs have heretofore been very much dreaded, from the want of knowledge as to their exact positions.

In addition to the execution of the above named detached surveys, my time has been devoted, for the greater part of the season, to the extension of the main triangulation to the westward, and to the continuation of the deep-water soundings; for this work four triangulation stations of the first class in point of height and solidity were required. The erecting of these stations and the clearing of the ground required a great deal of labor, but much of it was bestowed at times when the state of the weather was such as to prevent the carrying on of any other kind of work. In the new triangles which I have measured the sides are from ten to twenty miles in length. This last is the greatest distance over which I have as yet succeeded in commanding perfect views where both stations were upon the lake beach, where, for the uses of the hydrographic part of the survey, it is, in general, indispensable to have them; for if the interior heights are sought out and occupied for the triangulation, it can rarely be done without great labor of cutting out lines of view, still leaving the station masked from most

parts of the water within the command due to the height of the hills. These considerations have determined me to occupy for the triangulation, in this thickly-wooded country, the salient points of the coast, rather than the interior hills, except in a few peculiarly favorable cases, where a small amount of clearing will open the view from the summit to as much of the horizon as it may be desirable to command for the perfect connexion of the hydrography and triangulation.

The amount and description of work executed during the past season by the different parties is shown in the following abstracts, from which it will be seen that in all upwards of *one hundred thousand* soundings have been made this year. The actual number recorded is 101,105, which we have the means of laying down upon our charts. In addition to these, many others are made in preliminary examinations to guide us in laying out the work.

Abstract of work by Capt. Macomb's party on board the steamer Surveyor, season of 1854.

5 miles of shore line.
5 triangulation stations built, 2 of which for secondary triangles.
1,429 soundings from small boats.
668 soundings in deep water, from steamer.
9 sounding stations built.
8 tripods set on reefs, distant from 2 to 10 miles from land.
80 buoys located.
454 sextant angles, for locating soundings.
309 theodolite angles.
6 observations for magnetic variation.
3 observations on Polaris for true meridian.

Abstract of work by Capt. E. P. Scammon's party in the river St. Mary's, season of 1854.

3 base lines, 2,119.9, 1,137, and 702 feet long, cleared and measured with rods.
178 triangulation stations built, 7 of them from 10 to 25 feet high, and 4 of them being cribs in the water, to avoid cutting lines of sight and measuring long bases.
11 tripods placed on shoals and reefs.
455 sounding stations built.
182 buoys located.
7 miles of cutting, lines of sight 10 feet wide.
15,662 theodolite readings have been made.
709 sextant angles for locating soundings.
409 magnetic readings.
4 observations for true meridian.
50 triangulation stations, and ninety sounding stations repaired.
250 miles of shore line sketched.
55,221 soundings taken.
6 camps have been established at intervals averaging seven miles, and the stores, &c., moved by the party in barges.

The whole work has been computed in detached parts, to afford the requisite basis of the field sketching; this is to be raised before making the final map.

Abstract by the party under First Lieutenant Raynolds, Topographical Engineers, for the season of 1854.

70 miles of shore line run.
20 miles of roads and streams surveyed.
317 buoys located.
112 sounding stations built.
43,787 casts of the lead made.
3 tripod water stations placed on shoals, one at five miles from land.
6,002 theodolite readings for shore line and buoy locations.
246 compass readings.
5 observations for true meridian.
131 square miles of hydrography.

For purposes of secondary triangulation.

22 triangulation stations built, (sixteen of them from ten to thirty feet high.)
4 miles of cutting through the woods for lines of sight.
1,874 pointings of ten seconds Gambey theodolite.
5 camps have been established at intervals averaging ten miles; in the two longest moves we were aided by the steamer Surveyor; all of the moves were in the open lake.
165 meridian passages of stars observed at the astronomical station, including those observed in connexion with the moon; those observed for time, for deviation in azimuth, error of collimation, and value of the interval between the wires.
16 meridian passages of the moon, observed at the same place.

General remarks.

The experience of the past season has confirmed my opinion in favor of the methods and appliances which have been made use of in the prosecution of this great work since it has been in my charge. We have thus far been operating where we have enjoyed the very great advantage of being able to cover the field by a chain of triangles. This triangulation has been extended as far to the eastward as practicable, the expansion of the straits into Lake Huron becoming so great beyond the present limits of our work that the views across the water, from land to land, can no longer be commanded in such directions as to form a good chain, and I am unwilling to recommend the plan of cutting through the woods lines of view into the interior for the purpose of making a chain of triangles along the coast; but the plan which I would recommend for the extension of the survey of the lake coast beyond those limits where we can triangulate across the waters is, to establish stations on salient points of the shore, so that each station shall command a view of the stations next to it up and down the coast. By this means there will be formed a series of lines of sight, in which the angle should be carefully measured at each station between the two lines which meet there.

The distances between these stations would be from about six to twelve or fourteen miles, according to the form of the coast, and should be computed from lines of survey run out with the theodolite and chain along the beach, and verified by minor triangulation or by chaining. The latitude and azimuth should be observed at the beginning of such a line, and carried on by computation with the formula for computing the geodetic latitudes, longitudes, and azimuths, (as given in "Lee's Tables," second edition, page 65,) and verified by new astronomical observations at intervals of from sixty to one hundred miles. This method, depending for its verification on observed differences of *latitude*, is peculiarly applicable to coasts the general direction of which is nearly north and south, which happens to be the case with very much of the coasts of Lakes Huron and Michigan, lying beyond reach of our triangulations. These coast line measurements would be the proper duty of the party in charge of the coast hydrography of the district, because there will always be found ample time to do justice to measurement and verification of these lines whilst waiting for suitable weather in which to operate upon the water.

There should be a distinct party for the astronomical observations, which party might attend to noting the changes of water level and force and direction of currents in the vicinity of the coast observations, but should be charged with as little as possible besides the astronomy. Our force has always been too small to admit of a detail for astronomical duty without curtailing other operations which it was equally desirable to advance.

I would recommend that the work about the Beaver islands be finished next season, and that the main triangulation be pushed to the westward to Green Bay, if practicable, and also to the southward towards the Manitous of Lake Michigan, as far as time will allow. On this duty the steamer Surveyor could, when repaired, be profitably employed. I would also recommend that the survey of the St. Mary's river be extended from the Saut to Lake Superior, and that a party be sent up the south coast of that lake to make harbor surveys, as a commencement of work in that quarter. These harbor surveys should be thorough hydrographic surveys, embracing everything for a distance of at least five miles each way up and down the coast from any harbor of such importance as to require particular attention at this time.

With this report I beg leave to present an estimate for continuing the operations next year, in which it will be noticed that I have asked for additional funds for the construction of a new steamer for carrying on this work. Since the time of making my first estimate for this object last year there has been so great an advance in the prices of materials and labor that the sum then asked for, and granted, is found to be inadequate to the purchase of such a vessel as the work requires.

Estimate of funds required for the survey of the north and northwestern lakes, for the year ending June 30, 1856.

Party on the surveying steamer:			
1 assistant at	$3 50 a day (6 m'hs) 183 days.	$640 50	
1 ... do	2 50 .. do ... do	457 50	
1 chief mate or sailing master	$2 00 .. do ... do	366 00	
1 second mate	1 50 .. do ... do	274 50	
1 first engineer	2 00 .. do ... do	366 00	
1 second engineer	1 50 .. do ... do	274 50	
1 carpenter	1 50 .. do ... do	274 50	
1 steward	1 00 .. do ... do	183 00	
1 assistant to steward	83 .. do ... do	151 87	
1 cook	1 00 .. do ... do	183 00	
3 firemen and coal-heavers	83 .. do .each ... do	455 61	
1 leadsman	1 00 .. do ... do	183 00	
15 men, (boats' crews)	70 .. do .each ... do	1,921 50	
200 tons of coal at $6 a ton		1,200 00	
Supplies for party, six months		2,500 00	
		9,431 48	
Contingencies, 10 per cent		943 15	
			$10,374 63
For a shore party for one month:			
1 assistant at	$3 50 a day ... 30 days.	105 00	
1 ... do	3 00 .. do ... do	90 00	
2 assistants	2 00 .. do ... do	120 00	
1 foreman	1 50 .. do ... do	45 00	
1 assistant foreman	1 25 .. do ... do	37 50	
1 cook	1 25 .. do ... do	37 50	
1 steward	1 00 .. do ... do	30 00	
4 leadsmen	90 .. do ... do	108 00	
4 chainmen	80 .. do ... do	96 00	
28 boatmen, (4 crews of 7 each)	70 .. do ... do	588 00	
Subsistence of party		650 00	
Amount a month		1,907 00	
Amount for six months		11,442 00	
Transportation of party up and down		800 00	
Tents and camp equipage		600 00	
Purchase of two barges, $275 each		550 00	
Total for each shore party		13,392 00	
Three parties in the field			40,176 00
For an astronomical party:			
1 assistant at	$3 00 a day (6 m'hs) 183 days.	549 00	
1 time keeper	2 00 .. do ... do	366 00	
1 cook	1 00 .. do ... do	183 00	
7 men, (a boat's crew, each)	70 .. do ... do	896 70	
Subsistence		915 00	
Transportation and camp equipage		500 00	
Total for astronomical party			3,509 70
Allowances to five officers of topographical engineers, quarters, transportation, &c.			2,200 00
Pay of 1 computer and draughtsman at $4 a day			1,460 00
Office rent and fuel for office			600 00
Surveying steamer in ordinary, six months			2,500 00
4 assistants, (1 to each party,) in office during winter, at $3 50			2,562 00
5 assistants, including 1 for astronomical party, in office at $3			2,745 00
1 assistant at $2 50, and 8 assistants at $2			3,385 00
Repairs of steamer Surveyor, after the completion of the new steamer, new deck beams of iron, new decks of best southern pine, and rebuilding of upper works			10,000 00

ESTIMATE—Continued.

Contingencies, viz: transportation of boats; smith's work; purchase of new anchors; lumber; timber, spikes and nails for stations; buoy anchors and rope; paints, oils, leather, and other ship chandlery; stationery, drawing paper, &c	.....	$4,000 00
Amount requisite for completing the new iron steamer for the survey, in addition to the amount already appropriated	.....	50,000 00
Total amount of estimate for the expenses of the survey of the north and northwestern lakes for the year ending June 30, 1856	.....	133,512 83

All of which is respectfully submitted by your most obedient servant,

J. N. MACOMB,
Captain Topographical Engineers.

To Col. J. J. ABERT,
Commanding Corps of Topographical Engineers,
United States Army, Washington City, D. C.

APPENDIX B.

OSWEGO, *September* 1, 1854.

SIR: I have the honor to submit the annual report required by regulation of the progress of the several works committed to my care on Lake Champlain, Lake Ontario, and Lake Erie.

Burlington, Vermont.

The work at this place is a breakwater, 1,069 feet in length, and 35 feet in breadth on top, built of crib-work, and ballasted with stone. It is placed immediately in front of the wharves of the town in 30 feet water, and affords very good protection. Last year 100 feet in length was added to the north end of the breakwater, but the appropriation was exhausted before the crib was completed. There is more than timber enough on hand to finish this crib. I repeat my recommendation, that 200 additional feet be added to the north end; this will bring it under cover of a point of land to the north, and afford better shelter from northwesterly gales. An estimate for that purpose is herewith submitted. I had no means whatever for making a resurvey. Burlington is in the collection district of Vermont, which embraces the whole State. The port of entry is Alburgh. There is one light-house in this district, which is designated as No. 91, situated on Juniper island, Lake Champlain, south side of the entrance to Burlington harbor. The nearest fort is Fort Montgomery, at House Point, fifty miles from Burlington.

The duties collected in the fiscal year ending June 30, 1854	$67,975 00
Value of foreign merchandise exported	1,066,000 00
Value of domestic produce exported	310,101 00
Value of merchandise imported and entered for warehousing and transportation to other districts	502,665 00
Amount of hospital money collected	277 00
American tonnage entered	21,592 tons.
American tonnage cleared	20,499 "
Foreign tonnage entered	12,194 "
Foreign tonnage cleared	9,589 "
Tonnage on outstanding enrolment for steam vessels	4,527 "
Tonnage on outstanding enrolment for sail vessels	2,847 "

It is supposed that when the treaty of reciprocity between the United States and the British provinces goes into effect the commerce of this district will quadruple within eighteen months. The whole commerce and navigation of Lake Champlain would be directly or indirectly benefitted by the completion of the breakwater at Burlington.

ESTIMATE FOR COMPLETING THE WORK OF LAST YEAR.

1 foreman, 32 days, at $2 50 per day	$80 00
3 carpenters, 32 days, at $1 50 per day	444 00
2 laborers, 32 days, at $1 per day	64 00
	588 00

ESTIMATE FOR ADDING TWO HUNDRED FEET TO PRESENT BREAKWATER.

232	stick round hemlock timber, 50 feet long and 12 in. small end.	
54	do do 48 do do	
54	do do 46 do do	
54	do do 44 do do	
186	do do 40 do do	
28	do do 38 do do	
28	do do 36 do do	
360	do do 34 do do	
428	do white pine, 35 do do	
4,000	running feet white pine, to square 18 inches in length, of 35 feet and over.	
350	pieces white oak plank, 11 feet long, 3 inches thick, and 8 inches wide.	
9,000	trenails, to square 2½ inches, and 2 feet long.	
1,600	perch of stone.	
1,000	pounds 8-inch wrought spikes.	
4,372	running feet hemlock, at 8 cents	$3,445 76
14,980	do round pine, at 10 cents	1,498 00
9,000	cubic feet 18-inch square pine, at 15 cents	1,350 00
7,700	feet white oak plank, at $25	192 50

9,000	trenails, at 7 cents		$630 00
16,000	perch of stone, at 40 cents		6,400 00
1	boat-auger, rope, &c		200 00
1	foreman, 120 days, at	$2 50	300 00
10	carpenters, do	1 50	1,800 00
14	laborers, do	1 00	1,680 00
	Services of superintendent		1,460 00
	Services of agent 120 days, at $3		360 00
	1,000 lbs. wrought spikes, at $9		90 00
			19,406 26

Survey of the harbor of Ogdensburg.

This survey could not be accomplished for the want of assistance.

Oswego.

In the work done at this place I embody the report to me of the local agent, M. P. Hatch, esq.

During the remainder of the season after the 1st of September, 1853, the whole of the work there reported as unfinished (from B to C, on the accompanying sketch) was completed. Some progress was made in the removal of the large stone under water in the breach of 1852, and 90 feet in length was added to the west end of the temporary work constructed by Lieutenant Franklin, to prevent a further breach in the shattered and unfinished masonry, and the whole of the temporary work was raised and strengthened.

Operations were commenced this year about the first of May. All that portion of the pier pier-head east of the point marked D on sketch has been removed to a depth under water at which sound timber was found, and the reconstruction has so far progressed that more than one-half has been built to the full height, and the remainder is more than two-thirds done. The whole is filled with stone ballast so far as built, and about 100 cords of stone are quarried and piled on the shore, ready for boating.

That portion of the pier and pier-head east of the point marked E on the sketch has been designated as the light-house pier, and the expense of removing old work and reconstruction is charged to the light-house appropriation.

This work is located in the collection district of Oswego, New York, immediately west of the Oswego river, and covering its mouth. There is a light-house on the east end of the pier, and on the east side of the river, nearly opposite the light-house, and about four hundred yards distant, Fort Ontario is situated.

During the fiscal year ending June 30, 1854, the imports amounted to	$3,306,913 00
The exports amounted to	2,970,084 00
Total foreign commerce	6,276,997 00

The duty collected by American vessels was	$56,618 19
The duty collected by foreign vessels was	99,757 04
Amount of duties collected	156,375 23
Amount of duties secured on foreign goods passing through	698,170 65
Total amount of duties collected and secured	854,545 88
The tonnage entered and cleared (American)	1,217,822 tons.
The tonnage entered and cleared (foreign)	241,962 "
Total amount of tonnage	1,459,784 "

There can be no information procured at the custom-house in relation to the value of the coastwise or domestic commerce.

The State collector of canal tolls at Oswego on the 1st of January last estimated the property passing through the canal at $34,500,000 for the year, but the estimates were based upon very uncertain data.

From the best information I can obtain, I believe it safe to estimate the whole amount of the commerce for the last fiscal year at not less than $37,000,000, all of which will be directly benefitted by the completion of this work; and all the commerce passing to and from the ports on this lake must also be indirectly benefitted.

The want of increased harbor room at this place becomes more and more apparent every year. The commerce of this port—that of late years—has increased with great rapidity, and to which a great additional impulse must unquestionably be given by the "reciprocity" treaty lately concluded with Great Britain, must inevitably suffer very serious detriment unless immediate steps be taken to increase the size of the harbor.

For the completion of the works at this place upon the present plan, I copy the estimates submitted last year, with some variation, in consequence of the increased price of labor and materials, as follows:

Estimate for removing the unfinished masonry of the superstructure that was shattered by the storm of 1842, (part under water,) and rebuilding the same with timber and stone, as follows:

Removing old work.

20 common laborers 60 days, 1,200 days, at $1 12½	$1,350 00
2 overseers 60 days, 120 days, at $2	240 00
Blacksmiths making and repairing tools and iron	250 00
Ship-chandler, for blocks, cordage, &c	250 00
Total for removing old work	2,090 00

Rebuilding.

6,750 feet, cubic measure, pine timber, at 15 cts.	$1,012 50
750 feet, cubic measure, oak timber, at 25 cts.	187 50
10,500 feet, board measure, pine plank, at $15	157 50

6,000 feet, board measure, oak plank, at $30...	$180 00	
2,500 pounds in round iron, at 5 cts.....	125 00	
2,000 pounds in. spike, at 6 cts.....	120 00	
400 white oak trenails, at 3 cts.....	12 00	
1,200 day's labor, at $1 12½.....	1,350 00	
600 day's carpenters, at $1 75	1,050 00	
Blacksmith's work	125 00	
60 days each of overseer and master carpenter, at $2.....	240 00	
Total for rebuilding		$4,559 50
For rebuilding top of counter-forts inside of the pier, 325 feet long, 30 feet wide, and 5 feet high:		
11,625 feet, cubic measure, pine timber, at $15...	1,743 75	
28,250 feet, board measure, pine timber, at $15.	4,423 75	
1,500 pounds round bolt iron, at 5 cents.....	75 00	
1,000 pounds spike, at 6 cents.....	60 00	
400 white oak trenails, at 3 cents.....	12 00	
12 mooring-posts, at $10.....	120 00	
300 day's labor, at $1 12½.....	337 50	
120 day's carpenters, at $1 75	210 00	
30 days each of overseer and master carpenter at $2.....	120 00	
Blacksmith's work	62 50	
Total for rebuilding counter-forts		3,164 50
For removing large stone under water, that has been washed from the top of the pier, one crab-scow, with captain and eight men, five months:		
8 men 130 days, (1,040 days,) at $1 12½.....	1,170 00	
Captain of scow, 130 days, at $2.....	260 00	
Chains, grapplings, ropes, &c.....	500 00	
Blacksmith work and repairing.....	150 00	
Total for removing stone under water		2,080 00
For rebuilding pier in the breach caused by the storm of 1842:		
12,540 feet, cubic measure, pine timber, at 15 cts.	1,881 00	
950 feet, cubic measure, oak timber, at 25 cts.	237 50	
17,100 feet, board measure, pine plank, at $15..	256 50	
7,600 feet, board measure plank, at $30	228 00	
3,500 pounds in. round iron, at 5 cents.....	175 00	
3,000 pounds spike, at 6 cents.....	180 00	
700 white oak trenails, at 3 cents	21 00	
4 mooring-posts, at $10.....	40 00	
1,800 day's labor, at $1 12½.....	2,025 00	
900 day's carpenter, at $1 75.....	1,575 00	
2 overseers, 60 days each, at $2.....	240 00	
1 master carpenter 60 days, at $2.....	120 00	
Blacksmith work.....	100 00	
Total for rebuilding in breach.....		7,079 00

There will also be necessary for rent of wharves and stone quarry—the land heretofore occupied having been sold by the State of New York—the further sum of	$2,000 00
Compensation of agent one year	1,440 00
	22,413 00
Contingencies 10 per cent	2,241 30
Total for completing work	24,654 30

Which sum may, in my opinion, be judiciously expended in one year.

The above is exclusive of a considerable amount of dredging that will be necessary.

Sodus Bay, Cayuga Co., New York.

This beautiful sheet of water lies fifteen miles west of Oswego; it is one and a half miles in length, north and south, and an average width of one thousand feet; the water is very deep, 30 and 40 feet; the shores are bold, and afford great facilities for wharfing. This bay was formerly separated from the lake by a gravelly beach, with an outlet not exceeding one hundred and fifty feet, with one and a half feet of water on the bar.

It was surveyed under my direction in 1845, and a plan projected for the improvement of the entrance; in 1852, an appropriation of $10,000 was made to commence the work. In 1853, I was directed to make arrangements to begin the work, but, on visiting the place, I found the aspect of the bay entirely changed since the survey made in 1845, upon which the plan for improving the entrance was based. The bay was entirely open to the lake; the strip of gravel beach, which had formerly separated them, had disappeared, partly washed away by a succession of violent storms, and partly submerged by the high water of the lake. The lake was, at that time, 3.75 feet above its low water mark. Under these circumstances, I recommended a resurvey before commencing any work for its improvement, and a revision of the plan. This was approved by the Board of Engineers, and the survey was made in August, 1853, upon which a new plan was made. The works now proposed for the navigable entrance to the harbor are in effect the same as those proposed in 1845. The changes proposed are mainly changes of detail, such as were necessarily suggested by the alterations which had taken place in the form of the shore since 1845. The propriety of defending the beach was admitted by the Board of Engineers, and an estimate for it was inserted in the general annual estimate. It was afterwards suggested to substitute a rip-rapping or a deposit of shingle, instead of a row of piles as proposed in the general estimate; and this substitution the board approved, because of its greater economy and durability. I am very happy to say that this portion of the plan has succeeded, thus far, admirably. Light westerly and northwesterly winds raised the smaller shingle or gravel, and fills the interstices of the rip-rap work, forms a solid mass, and the beach ac-

cumulates in front of it. It has already accumulated six hundred feet, in length, which is more than one-third the distance from the west side of the bay to the position of the piers, varying from fifty-seven, the greatest, to ten feet, the smallest in width, and three feet above the level of the lake.

When the season for operations approached this year, it was considered doubtful whether it would be judicious to commence this work with so small an amount as the balance of the appropriation, about $4,000, although there was a large amount of material on hand, particularly after a decision of the Hon. Secretary of War, on approving the plan; but the president (of the L. O. A. and New York Railroad Company, which road has a terminus on the bay,) pledged himself to raise the difference between the balance on hand and the estimate approved by the Board of Engineers, and I was ordered to go on with the work. The rip-rap was commenced on the west side of the bay on the 16th June, and was continued until it reached the channel, or the position of the west pier. On the 3d of August the first crib was placed; since that time, seven cribs have been placed on the west pier; the first three cribs are raised to the full height; it is contemplated to place one more crib, and to finish the whole before the working season closes. The rip-rap is finished between the west side of the bay and the pier, and the accumulation of shingle has been very rapid; a beach has formed from the west side 600 feet in length, varying from 57 feet to 10 feet in width, and 3 feet above the surface of the lake.

The dredge-boat was set to work here early in August, but worked to great disadvantage because of the shoalness of the water, in fact, the scows belonging to the dredge could not be used at all, as they drew too much water. I was compelled to send up a scow belonging to the work at Oswego. The citizens of the vicinity manifested a great interest in the operations, and numbers volunteered to aid the dredge, and by means of road-scrapers, hoes, &c., &c., deepened the water, so that the dredge could work to more advantage. It was a tedious, slow operation, but by great diligence and perseverance on the part of Captain Malcolm, the commander of the dredge, a channel of six feet in depth has been cut through to the lake. This bay is in the collection district of Oswego, the nearest light-house is at Oswego, and the nearest fort is at Oswego. Heretofore, there has been no commerce at this bay, owing to the peculiar formation of a gravel bar in front of it; it was inaccessible, but, hereafter, when the railroad, now being constructed between this bay, the city of Auburn and New York, is completed, and a safe and deep entrance made, from its decided advantages of great depth of water, space, and perfect security against storms from any quarter, I think it is destined to become a place of great importance. This harbor, when completed, will be of great value to the whole commerce of the lake. I submit the following estimate for its completion, which is the same approved by the Board of Engineers.

Estimate for building piers at the mouth of Sodus Bay, Cayuga county, New York.

East pier, 1,050 feet long, 20 wide—	
28 side piers, 31 feet long, 868 feet, at 4 cents	$34 72
14 centre stringers, 30 feet long, 420 feet, at 4 cents	16 80
42 ties, 20 feet long, 840 feet, at 4 cents	33 60
9 bottom pieces, 30 feet long, 270 feet, at 4 cents	10 80
730 lbs. 1½-inch iron bolts, 3 feet long, at 5 cents	36 50
50 cords of stone, at $2 50	125 00
Carpenters and labor	45 00
Cost of crib, 30 feet in length	302 42
35 cribs, at $302 42	10,584 70
52,500 feet, board measure, 3-inch pine plank, at $10	525 00
1,530 lbs. 6-inch spikes, at 5 cents	76 50
	11,186 20
Rip-rap from south end of east pier to the point on the east side of bay, 1,560 feet in length, 218 cords of stone, at $2 50	545 00
	11,731 20
West pier, 1,300 feet long and 20 feet wide—	
43 cribs, at $302 42	13,004 06
6,500 feet, board measure, 3-inch pine plank, at $10	650 00
1,930 lbs. 6-inch spikes, at 5 cents	96 50
	13,750 56
Rip-rap from south end of west pier to the shore, 1,260 feet in length, 160 cords of stone, at $2 50	400 00
	14,150 56

RECAPITULATION.

Cost of west pier and rip-rap	14,150 56
Cost of east pier and rip-rap	11,731 20
	25,881 76
Contingencies, 10 per cent	2,588 17
	28,469 93

Sodus Bay, Wayne county, New York.

Nothing has been done at this work this season, the appropriation having been exhausted last year, and it is in a very decayed condition,

except that portion of the east channel and the east harbor pier which was rebuilt last season.

The remainder of the east harbor pier, which is down below the surface of the water, requires to be rebuilt, and the entire west pier, from the beacon light to the beach, is so much decayed that it must be rebuilt.

This bay is situated in the collection district of Oswego. There is a light-house on the west bank at the entrance to the bay, and a small beacon light at the north end of the west pier. The nearest fort is Fort Ontario at Oswego.

The commerce of this bay is at present not of much consequence, owing chiefly to the want of a communication with the interior, but the Sodus Point and Southern Railroad Company, regularly organized in April, 1852, under the general railroad law of the State of New York, propose to construct a road, on the broad guage, from Great Sodus Bay on Lake Ontario, by the shortest and most direct route practicable, to a connexion through a portion of the Canandaigua and Elmira railroad with the New York and Erie road, at the village of Elmira; only about thirty-five miles of road remains to be built to effect this connexion.

This road is already begun, and when completed will no doubt attract a good proportion of trade to this bay, for which it is so peculiarly well adapted to accommodate, as to place, depth of water, facilities for wharfing, and perfect security in storms; as a harbor of refuge it is of great importance to the commerce of the lake.

The number of arrivals during the year ending June 30, 1854, was—

Coastwise	4,529 tons.
Clearances coastwise	4,529 tons.
Foreign arrivals	340 tons.
Value	$956 33
Duties collected	202 86

I submit the following estimate for this work:

East harbor pier.

Hemlock, 240 pieces, 12 by 12 by 30 feet, at 12½ cents	$900 00
Do. 275 do. do. 14 do. 12½ do.	481 25
Oak, 130 do. do. 30 do. 25 do.	975 00
Oak, 130 do. do. 14 do. 25 do.	455 00
Iron, 700 pounds, 1½-inch, for bolts, at 5 cents	350 00
Iron, 4,000 pounds, 6-inch spikes, at 7 cents	280 00
Plank, 34,000 feet 3-inch plank, at 15 cents	510 00
Labor, superintendence, &c.	3,048 75
	7,000 00

West channel pier, from beacon light to the beach.

Hemlock, 480 pieces, 12 by 12, 30 feet, at 12½ cents	$1,800 00
Do. 640 do. do. 18 do. 12½ do	1,440 00
Oak, 220 do. 12 by 12 by 30 feet, at 25 cents	1,650 00
Oak, 220 do. do. 18 do	990 00
Iron, 15,000 pounds, ½-inch bolts, at 5 cents	750 00
Iron, 6,000 6-inch spikes, at 7 cents	420 00
Plank, 65,000 feet, 3-inch pine, at 15 cents	975 00
Labor, superintendence, &c	4,015 00
	12,040 00
East harbor pier	7,000 00
	19,040 00
Contingencies, 10 per cent	1,904 00
	20,944 00

Genesee river.

The west pier at this habor, 1,943 feet in length, was entirely rebuilt last season. The east pier, 2,034 feet in length, is decayed to the water's edge, and several breaches in it below the surface of the water. In moderate gales of wind it is entirely submerged, which renders the approach of vessels to the entrance of the pier very dangerous. It requires to be entirely rebuilt. This harbor is in the collection district of Genesee; port of entry Rochester. The amount of duties collected in the last fiscal year was $24,378 83. There is a light-house on the high ground, just west of the piers, and a small beacon light at the end of the west pier. The nearest fort is at Oswego. There is considerable trade coastwise and with the Canadas from the port, and from its peculiar position, (being about midway of the lake,) the commerce of the lake is interested in this harbor being preserved.

ESTIMATE.

Pine timber, 12 by 12	$6,600 00
Oak timber, 12 by 12	4,730 00
Pine plank, 3-inch	2,000 00
Stone ballast	800 00
Wrought iron spikes	400 00
Iron for bolts	2,000 00
Labor and superintendance	5,000 00
	21,530 00
Contingencies, 10 per cent	2,153 00
	23,683 00

Oak Orchard creek.

The west pier of this harbor is 844 feet in length and 20 feet wide; 290 feet of this was built last season and is in good condition; 150 feet in length was repaired—the remaining portion is much decayed and requires repairs. The east pier is 734 feet long, 20 feet wide; is in a very decayed condition and requires to be re-built. It was the original intention to carry these piers out to a depth of 18 feet, but the board of engineers having decided upon 15 feet as the maximum depth, the estimate will be for that depth. This harbor is in the Niagara collection district. Charlotte is the nearest port of entry; no duties collected. The nearest light-house is at Genesee river, and the nearest fort is Fort Niagara. At present there is no regular trade with this harbor, but it is within two miles of the Erie canal, and a survey has been made for the purpose of a railroad to connect with the interior; being midway between Genesee river and Niagara river, it is important to the commerce of the lake as a harbor of refuge.

ESTIMATE.

34 side pieces, 12 by 12, 30 feet long, 1,020, at 13 cents	$132	60
5 bottom do 12 by 12, 28 do do 140, at 13	18	20
15 do do 12 by 12, 26 do do 390, at 13	50	70
3 do do 12 by 12, 20 do do 60, at 13	7	80
64 do do 12 by 12, 20 do do 1,280, at 13	166	40
4 do do 12 by 12, 30 do do 120, at 13	15	60
53 cords of stone, at $3 25	172	25
1,305 feet board, measuring 3 inches, pine plank, 20 feet long, at $11	14	35
60 wrought spikes, 6 inches, at 7 cents	4	20
864 pounds 1½-inch iron, at 4½ cents	38	88
Mechanics and laborers	250	00
Cost of one crib	870	98

WEST PIER.

20 cribs, at $870 98	17,419	60

EAST PIER.

18 cribs, at $870 98	15,677	64
Repairs	3,743	65
	36,840	89
Contingencies, ten per cent	3,684	08
	40,524	97

Harbor of Buffalo.

The work at this harbor has been confined to rebuilding the protecting wall of the south pier, which was thrown down by a violent storm in 1843; 1,760 cubic yards of the ruins have been excavated and removed; 380 cubic yards of concrete and masonry have been laid for foundation; 500 cubic yards of ashlar laid in the wall; 1,000 cubic yards rubble filling behind the wall; 317 cubic yards slope wall constructed; 272 superficial yards flagging on the top of the wall; 9,000 superficial feet of ashlar dressed; 3,039 feet of flagging picked; 75 cubic yards tow-path relaid, and about 2,000 tons of stone transported from the quarry at Black Rock.

This season the whole will be completed as far inland as is necessary; but I would recommend the rebuilding of the wall about the light-house—the present wall is built of small stones and exhibits signs of yielding. I would also recommend the renewal of the tow-path to correspond in character with the wall, and for its greater security; it is now in a very dilapidated condition, having been frequently run into by vessels. I would recommend that it should be taken up to the depth of the foundation of the wall; if practicable, faced with masonry, similar to the wall filled in with concrete and paved with flagging. This, I think, would finish permanently this harbor as at present projected.

The harbor of Buffalo is in the collection district of Buffalo Creek. There is a light-house at the extremity of the south pier, and the nearest fort is Fort Porter at Black Rock. The amount of revenue collected during the fiscal year, ending 30th of June, 1854, was $83,572.

The amount of tonnage arrived and departed during the last fiscal year was nearly 4,000,000 tons, with an anticipated increase. Placed, as this harbor is, at the terminus of the navigation of the lake, the whole commerce of the lake is interested in the present harbor being kept up, and there are pressing calls for its enlargement.

I submit the following estimate for the completion of the present plan:

Estimate for removing and rebuilding the towing-path of south pier, Buffalo harbor, New York.

The old work to be removed five feet deep, twenty feet wide and 1,420 feet in length.

The new work to be placed with ashlar (twelve inch stones) four feet high and three feet wide, with a coping, twelve inches thick, over the wall, a filling of concrete behind and a flagging ten to twelve inches thick (edges picked square) laid over the concrete.

Removing old work, 4,237 cubic yards, at 20 cents.....	$847 40
Filling of concrete, 3,576 cubic yards, at $2.....	7,152 00
Dressing ashlar and coping, 58,633 superficial feet, at 5 cts.	2,931 65
Picking flagging, 29,480 running measure, at 5 cents.....	1,474 00
Setting face, wall and coping, 818 cubic yards, at $2.....	1,636 00
Setting flagging, 2,682 superficial yards, at 30 cents.....	804 60
Cement for wall and coping, 272 bbls., at $1 50.....	408 00
Sand, 2,720 bushels, at 2 cents.....	54 40

Stones, about 1,200 tons, at $1 25	$1,500 00
Six stone moving posts, (in place of those broken,) at $20.	120 00
	16,928 05
Contingencies, ten per cent.	1,692 80
Total	18,620 85

Estimate for removing and rebuilding about thirty-seven feet of wall in front of light-house, Buffalo harbor, New York.

Removing old work, 278 cubic yards, at 37½ cents	$104 25
Laying foundation of concrete and masonry, 55 cubic yards, at $2 50	137 50
Setting ashlar and coping, 120 cubic yards, at $2	204 00
Filling rubble behind wall, 150 cubic yards, at 25 cents	37 50
Setting flagging on top of wall, 35 super. yards, at 30 cts.	10 50
Dressing ashlar and coping, 2,570 super. feet, at 6½ cents.	167 05
Picking flagging, 385 feet running measure, at 5 cents	19 25
Stones, about 450 tons, at $1 25	562 50
Tools, implements, &c.	100 00
Cement, 60 bbls., for wall, at $1 50	90 00
Sand, 600 bushels, at 25 cents	12 00
	1,444 55
Contingencies, ten per cent.	144 45
Total	1,589 00

Estimate for dredging along south pier and of pier head into ten feet water.

800 cubic yards, at 25 cents	$2,000 00
Contingencies, ten per cent.	200 00
	2,200 00

RECAPITULATION.

For tow-path, south pier	$18,620 85
For re-building wall in front of light-house	1,589 00
For dredging along south pier	2,200 00
Total required	22,409 85

Dunkirk Harbor.

There has been no work done here this season, the plan not having been perfected by the Board of Engineers.

This, being the terminus of the great Erie railroad, must necessarily

become an important point in commerce, and, from its position on the lake, about midway between Buffalo and Erie, is very important as a place of refuge.

Dunkirk is at present in the collecting district of Buffalo Creek, N. Y. Congress at its last session created a new district, to be called the District of Dunkirk, and Dunkirk to be the port of entry; this new district has not yet been organized; no duties have been collected here. There is a light-house on the first point of land west of Dunkirk. The nearest fort is Fort Porter, at Black Rock. The amount of tonnage arriving and departing from this place is 300,000 tons annually.

The value of property received by the lake for the year ending 31st August, was $10,000,400, and the value of merchandise brought by the Erie railroad to be shipped from this point was $15,000,000; and the value of provisions, &c., brought to this place for local use, and for supplying the neighboring counties, was $365,113 90; making a total of $26,365,113 90. Thirty thousand emigrants were shipped from this point this season.

This large amount of commerce, and which is increasing annually 25 to 50 per cent., would be greatly benefitted by the completion of a harbor at this point.

Harbor of Erie, Pennsylvania.

The work done this season at this harbor was chiefly in the repairs of the south channel pier at the east end of the bay, and this has been thoroughly done as far as the angle with the land pier, and in an endeavor to check the abrasion of the west end of the island. Last year I made an experiment by placing a few watlings of hemlock brush perpendicular to the shore, with a view of intercepting the travelling beach. The effect was so far satisfactory that I was induced to continue the experiment this season, and covered the whole abraded portion with hemlock brush, secured by stakes, and partially loaded with stones. It has stood remarkably well some severe blows from the northwest, and has collected some sand, but the lake has subsided a great deal and left it exposed; but I think that this method, probably improved upon, will eventually succeed, and I think it would be the best method of accumulating the beach again and stopping the breach at present existing at the west end of the bay, which is very essential to the protection of this fine harbor. The shoal water is rapidly extending eastward, as will be seen by the survey of this season, a map of which accompanies this report. This harbor is in the collection district of Presque Isle, and the amount of duties collected during the last fiscal year was $1,640 15. There is a light-house on the bank of the lake immediately south of the entrance of the piers, and there is a beacon light on the end of the north pier. The nearest fort is Fort Porter, on the Niagara river. The amount of tonnage of 5 steamers and 26 sailing vessels, owned here, is 9,953. The number of arrivals and departures are 1,860; and there are 12 foreign vessels which trade with this place, and hundreds of vessels seek this harbor as a refuge from storms.

It is very important to the commerce and navigation of the lake that it should be permanently kept up.

I submit an estimate for closing the breach at the west end of the bay:

800 loads of hemlock bush, at $1	$800 00
200 cords of stone, at $8	1,600 00
Labor and superintendence	2,000 00
A new crane-scow	600 00
	5,000 00
Contingencies 10 per cent.	500 00
	5,500 00

Respectfully submitted by your obedient servant,

W. TURNBULL,
Brevet Colonel.

Col. J. J. ABERT,
Chief Bureau Topographical Engineers.

APPENDIX C.

OFFICE OF GENERAL SUPERINTENDENT PUBLIC WORKS,
Cleveland, October 20, 1854.

COLONEL: I have the honor to submit to the Bureau of Topographical Engineers the following report of operations upon the several works within the district under my charge, for the year ending September 30, 1854.

This district extends from Conneaut, near the eastern boundary of the State of Ohio, to Monroe at the mouth of the river Raisin, and embraces nine harbors, viz: Conneaut, Ashtabula, Grand River, Cleveland, Black River, Vermillion, Huron, Sandusky Bay, and the harbor of Monroe.

For all these works appropriations were made by Congress in 1852, and I proceed to give in detail a sketch of the operations at each during the year; and also, in obedience to your instructions, to submit estimates of the funds required to place each of them in a complete state of repair.

Conneaut Harbor.

The repairs for this work were commenced early for the season—early in May—and have been chiefly directed to the rebuilding of the ruinous portion of the west pier, for a distance of 330 feet, which has been completed in the most permanent and substantial manner. This completes the repairs contemplated to the piers as far as they at present extend, 250 feet of the old work, on both piers, being found to be in a sufficiently sound condition to last for many years.

The amount of the last appropriation for this harbor was $10,000,

of which $9,537 79 has been expended up to September 30, when the repairs were finished, leaving in my hands the sum of $462 21 to the credit of the work.

The whole amount of work done during the two past seasons with the money expended has been 890 feet of pier entirely rebuilt, 120 feet thoroughly repaired, a new crane-scow built, and a complete survey of the harbor made, with the soundings, a chart of which has been transmitted to the Topographical Bureau.

An estimate was submitted with my last annual report for the extension of the east pier 275 and the west pier 325 feet, on parallel lines from the present pier, at a cost of $19,855, as recommended by Mr. J. A. Potter, the local agent of the work. The Board of Engineers for Lake Harbors and Western Rivers, in their report of the 10th September, 1843, recommended that the length of the piers should be limited to the inner line of the 12 feet water, and submitted an estimate *pro rata* from that of the agent, (which was for 600 feet,) restricting the length of both piers to 300 feet at a cost of $9,927 50.

The local agent has renewed that estimate in his report of this year, with a slight addition to the prices before estimated, in consequence of the enhanced prices of both materials and labor over those of last year. The estimate, a copy of which is hereunto attached, amounts to $23,049 62.

The pro rata estimate for 300 feet as recommended by the Board is	$11,524 81
Add compensation of agent for one year	1,460 00
Total estimates for Conneaut harbor	12,984 81

The harbor of Conneaut, which is within the collection district of Cuyahoga, has been selected as the eastern terminus for a railroad, traversing the eastern portion of the State of Ohio, and of western Pennsylvania, connecting directly with the city of Pittsburgh, passing through the intermediate coal region. A company has purchased a site at this harbor, upon which they are about erecting smelting works of an extended character, for the purpose of working the iron ore of Lake Superior. It is a port of growing importance, not only as a harbor of refuge, but as an outlet for the agricultural and mineral products of the rich and fertile country of which it is the focus.

Harbor of Ashtabula.

The last thing done at this place, last season, was an attempt to secure the end of the west pier against further damage. The outer end of this pier, for the distance of about 90 feet, had been swept away during a gale in 1852, to a depth of from five to nine feet below the surface of the water. This was done in the best manner possible at the time, but the integrity of the old work having been once destroyed, it was to be totally unable to withstand the force of the autumnal gales; and about 60 feet more of this pier was swept away to from five to seven feet below the surface.

The repair of this pier has occupied the present season. Cribs have

been sunk upon and bolted to the old work, until level with the surface of the water, upon which the pier has been rebuilt with long and heavy timber, bolted with iron—care being taken in all cases to break joints over the cribs, and, indeed all the way up, so as to make the work as firm and homogeneous as possible. This was done for the distance of 300 feet, 190 feet (the outer angle) being 18 feet wide, and the rest of the pier, running to the beach, 13 feet.

In his report to me, the agent of this harbor says: "This much has been attended with difficulty, in consequence of the indifferent construction of the old works. It is at all times difficult to get good foundations for new work upon old, at that depth, but it has been particularly so at this point, owing to the utter want of system in sinking the former work. We seldom find two of the cribs lying in the same direction; they are built in the most temporary manner, and in many cases are not bolted—generally of round timber with the cross ties dropped into jambs, chopped into the crib logs, not even fastened by wooden pins. It is not an unusual thing, after having labored for days to clear a bottom for the new crib to rest upon, to find in a few minutes a whole course of the old timber floating up, making it necessary to bolt the old work (in deep water) before sinking the new crib upon it."

In the truthfulness of these remarks I fully concur. No small proportion of the expense of these repairs is absorbed in preparing the foundation upon the old work sufficiently stable and reliable to warrant the construction upon it of that which is to rise above the water. The timbers of the old work were for the most part too small; the ties, in many instances not exceeding five inches in thickness, were insufficiently fastened, and in many cases, are now only held together by the weight of the stone with which they were originally filled.

The last appropriation for the harbor was $10,000, of which $9,346 15 had been expended on the 30th of September, leaving in my hands a balance to the credit of the work of $653 85. The amount of work completed, as exhibited on the accompanying sketch, is 670 feet of pier; 490 of which has been rebuilt from below the surface of the water, in most cases from five to eight feet, and 200 feet thoroughly repaired.

An estimate was submitted last year for continuing the improvement of this harbor by an extension of both piers into the lake. The same estimate is again submitted, with an increased price for materials and with an additional item for continuing the repairs of the old work.

For continuing the improvement of Ashtabula harbor as per estimate hereto attached	$24,516 40
Completing the repairs of the old piers	4,500 00
Contingencies, 10 per cent	2,901 64
	31,918 04

The harbor of Ashtabula is situated within the collection district of Cuyahoga, 60 miles east of Cleveland, and 30 miles of Grand River. It is an important town of the northeastern portion of the State; surrounded by a dense populated district, and having a large surplus of products to export, its business and commerce is rapidly increasing. Railroads are now in progress connecting the port directly with the

Ohio River, passing through some of the richest portions of the country, the greater portion of whose productions will seek an outlet to market from the harbor. The benefits, therefore, to the agricultural and, in fact, every interest of the country, from the completion and maintenance of the harbor, cannot but be of the greatest importance.

Harbor of Grand River.

The operations at this harbor, for the past season, have been directed chiefly to the repair of the dilapidated portion of the west pier, commencing at the point where it was left last year (as indicated on the accompanying sketch) and continuing the rebuilding inland to the point, also designated on the chart, where it has been well secured.

The whole amount of work done with the present appropriation, during the two past seasons, is as follows:

One thousand two hundred and fifty feet rebuilt, 280 of it from three to seven feet below the surface of the water, and the rest from the water line; 290 feet thoroughly repaired, including the outer end of the angle of the west pier, which has been refilled with stone. A complete and minute survey has also been made, and the chart transmitted to the Topographical Bureau.

The amount of the appropriation was $10,000, the amount expended up to the 30th September, $9,882 14, leaving $177 86 in my hands, to the credit of the work.

With my last annual report I transmitted an estimate of the local agent for this harbor, providing for "the extension of the east pier 500 feet in continuation of the present line of that pier; and the extension of the west pier from a point about 160 feet from where that pier begins to 'flare,' outward for 400 feet, on a line parallel to the east pier, and for pier work to connect the head of these 400 feet with the head of the present west pier." The estimate which amounted to $35,277 88, was not adopted by the Board of Engineers, but was modified, the contemplated extension being confined by them to the lengthening of the east pier 320 feet, to bring it out into the lake as far as the west pier, and to the reconstructing of 60 feet of the pier on which the beacon is placed, equal to 380 feet of pier, at a *pro rata* cost of $11,556 54.

From the recommendation of the Board, as to the extent of the contemplated improvement, I do not feel authorized to depart, and therefore will but remark, that an estimate for the same extent of improvement as was contemplated last year has been submitted this season by the same agent, but with an increase as to the cost, in consequence of the increased price of materials, amounting to $41,346 82.

The pro rata estimate of the Board, founded upon the estimate of last year, including the compensation of an agent for one year, was $13,016 54. The pro rata estimate founded upon the same estimate submitted the present year, at the increased prices, will therefore amount, including the compensation of an agent one year, to $15,004 56.

This harbor is 30 miles east of Cleveland and is within the collection district of Cuyahoga.

In his report to the general superintendent, in reference to this harbor, the agent uses the following language, which I quote as expressing fully my own views as to the importance of this port to the navigable interests of the lake. "The harbor of Grand river has, from the first commencement of the system of lake harbor improvements, been ranked as the very first upon the lake, owing to its great width of entrance, depth, and general capacity. Its trade and commerce are rapidly increasing, and it has been selected as the termination of a railroad traversing central Ohio to the city of Cincinnati, which road is now in progress of construction, the trade of which will at once be of the greatest importance. The most sanguine expectations have ever been more than realized in the lake region, where railroads have been brought to any point where facilities for shipping the products of the country could be obtained. As to the question 'of what amount of commerce would be benefitted by the completion of this harbor,' I do not know the value of the commerce of the lakes; the benefits cannot be estimated by dollars. The safety of the life of the mariner, the harbor of refuge for our lake craft during the violent gales of the autumnal months—these and numerous other considerations must be taken into the account, extending through every branch of trade and traffic. It is no unusual thing for this port to afford shelter, during our fall gales, to from 20 to 50 vessels of all classes, from the large steamer to the small coaster. The limited sea-room and the suddenness of the gales upon the lakes make every additional harbor of importance to all."

Harbor of Cleveland.

At Cleveland active operations were deferred until late in the season, waiting the decision of the Board of Engineers upon the plan for the construction of the west pier. The interval was occupied by a small force in counterhewing the timber which had been delivered under contracts made the preceding season.

The plan recommended by the Board, and approved by the Secretary of War, for continuing the improvement of this harbor, is to construct a new pier which shall occupy a line on the natural bottom of the lake, outside of the present dilapidated structure, and at the foot of the inclined plane which had been artificially formed by depositing large quantities of loose stone along the outer or lake side of the old pier, with the intention of securing the work against the destructive action of the waves. This plan was adopted by the Board to avoid the effects produced by this inclined plane, to which, beyond doubt, the destruction of this pier was mainly owing, and also to secure "the advantage of presenting a vertical front to the sea, and of annulling its force more effectually than by the old system of rip-rapping." Respecting this now exploded system, the Board, in its report upon this work, uses the following language: "The Board need not, at this late day, declare the opinion that this course of proceeding, so popular in the early history of the lake harbors, and so specious, was the very one, of all others, most likely to bring about the result it was designed to avert. An inclined profile of the surface of a work exposed to the batter of heavy seas, when a vertical face can easily be formed, meets at pre-

sent but few advocates among hydraulic engineers. This practice of rip-rapping was most emphatically condemned by the bureau in the annual report of 1839, soon after taking charge of the harbor of improvements, and it was thenceforth abandoned."

The state of the western pier of this harbor is a striking corroboration of the truth of these remarks. No further extension of either pier is contemplated in the project of the Board.

The plan of improvement adopted by the Board will create the necessity of either removing the old pier altogether, and thus widening the harbor by the distance between the inner line of the old and that of the new pier, or of so building up the old pier as to form an interior face to the west side of the harbor at its present width, as well as that of a superstructure for connecting the two piers by planking, and thus forming them into one.

There are two objections to the first alternative. First, the great expense of removing, at a great depth, the large body of stone contained not only in such of the cribs as remain intact under water, but also the masses which, having been set free by the destruction of the pier above water, have been washed out into the harbor and now form a sort of rip-rapping to the inner face of the pier, similar to that which had been placed outside of it; and secondly, the increased width which, by this removal, would be given to the harbor *at its mouth*, by which it would be rendered less secure as a harbor of refuge against the rolling in of the sea in heavy gales from the northwest, north, and northeast. This increase of width, too, by deadening, to no small extent, the force of the river current, which is a powerful auxiliary in keeping open the channel, might hazard the maintenance of the depth of water at present found between the piers, if it did not cause, or at least facilitate, the formation of a bar off the mouth of the harbor. It is true that the increased width thus given to the harbor at its mouth would afford additional facility to its entrance from the lake during heavy gales; but as it is now sufficiently wide for that purpose, and affords as much, if not more, room between the present pier than is to be found at any point above, where vessels resort for the discharge and reception of their cargoes, it is not conceived that the doubtful advantages to be gained by the removal of the old pier would at all warrant the great expense or the risk that would thereby be incurred of diminishing the depth of water at the entrance.

The repair, therefore, of the old pier is deemed preferable; and an estimate is accordingly submitted for facing up a portion of it, rebuilding other portions where this cannot be done, and for connecting both by a substantial bridge or planking—thus forming a pier with a width of (125 feet from its head) 66 feet, diminishing, on the one hand, at the outer end, and on the other at the shore, to 50 feet.

The substitution of cribwork, in the removal of the old work, for piling, as suggested by the Board, is believed to be necessary, on account of the great difficulty to be apprehended in driving the piles along the inner face of the work. The stone which originally filled the old work above the water, and in some cases to a depth of six or eight feet below the surface, have, by the decay and destruction of the cribs, for the most part, been deposited inside the work and have become

mixed with sand; leaving the whole inner face of the pier, along that portion which still remains, lined with a rip-rapping, talus, or pavement, which is many feet thick and as hard and compact as a Macadamized road. It is almost impossible to penetrate this mass with even a shod pile, and owing to the size of a great many of the stones forming the mass, the preservation of anything like a regular alignment for the inner face of the work would be next to impracticable.

Enough of the old work remains below the water surface upon which to build the new cribs in a manner sufficiently secure for the purpose they are intended to subserve, as they will be backed and strengthened by the new pier outside of them, and with which they will be connected by the superstructure.

The estimate of the Board for the construction of the new pier, is $19,910; in addition to which I submit an estimate for the renewal of the old work, and for connecting them together in the manner proposed, of $19,565 63.

In a report to the bureau of March 2, 1854, I stated that the outer end of the east pier, which is constructed of cut stone laid upon the old wooden structure under water, had been almost entirely demolished by a large steamer coming in contact with it in a heavy storm, whilst endeavoring to make the entrance to the harbor, and that the whole of this part of the work would have to be taken up and rebuilt. The portion of the pier which is damaged by this and a subsequent concussion with another steamer, is 66 feet in length by 16 feet in width. It is so badly damaged that it would be necessary to take down the whole of it and to rebuild it from the foundation. I submit an estimate of the workmanship and labor only, there being, as is believed, an abundance of stone block remaining on hand to answer the demand.

An estimate is also submitted for replacing the wooden "platform" in front of the beacon on the east pier, with a structure of stone to correspond with that of the rest of the pier. This platform is described in a report to the bureau of August 11, 1853, and is designated on the sketch of the harbor accompanying this report.

The beacon light on the end of the pier is a cast-iron structure, placed upon a foundation of cut stone, 14 feet square, which is surrounded by a wooden crib 28 feet by 30, filled with stone. It is proposed to remove this wooden crib and to replace it with stone, connecting it with the "platform," as to form a pier-head of masonry 41 feet wide by 90 feet in length. The wooden crib surrounding the beacon is in a state of decay and should be made as solid as possible, so as to protect the foundation of the beacon, which, although well built, is by itself entirely too small to resist the shock of the sea in northeast gales. The estimate of this portion of the work is but $3,739 50, and is necessary to a complete finish of the pier-head. The whole estimate for this work is, therefore, as follows:

Estimate for Cleveland harbor.

For the construction of the new western pier, as per estimate of the Board of Engineers	$19,910 00
For rebuilding and repairing the old western pier and connect it with the new pier, as per detailed estimate attached	19,565 63
Total for the west pier	39,475 63

East pier.

For removing old stone work for 66 feet on the outer end of the east pier, destroyed by a steamboat, and rebuilding it, (labor only)	6,877 20
For tearing up the "wooden platform" in front of the beacon, and replacing it with a structure of masonry to correspond with the rest of the pier and form a solid pier-head	15,152 50
For tearing away the wooden crib surrounding the beacon to replace the same with a structure of masonry connecting it with the pier-head propoeed to be rebuilt as above	4,113 45
Total for east pier	26,143 15

RECAPITULATION.

West pier	39,475 63
East pier	26,143 15
	65,618 78
Deduct, being amount of appropriation on hand and available for west pier	25,000 00
Amount required to place the harbor in a complete state of repair	40,618 78

The value and importance of the harbor of Cleveland to the navigation of the lakes is too well known to require at this day any labored description. The terminus of the Ohio canal, the concentrating focus for railroads from New York, Buffalo, Pittsburgh, Cincinnati, Louisville, St. Louis, Toledo, Chicago, its rapid growth in population and commercial standing, is almost unprecedented in the annals of this country. From an insignificant village, when the improvement of this harbor first commenced, it has grown into a city of 50,000 inhabitants, and is increasing with a rapidity and steadiness that give incontestible evidence of its future. The harbor, which is the undoubted origin of all this prosperity, and which at one time would have supplied ample space for the accommodation of the whole navigators of the lake, is daily becoming too contracted for the shipping that daily resort to it, burdened with the products of every clime. Already extensive wharfs and piers

have been extended into the lake, and are covered with immense depots and warehouses which, ere they can be finished, will be filled to overflowing. The great and steadily increasing trade at this port will, ere long, demand the erection of a breakwater for the protection of the lake front, and the safety of the fleets which seek it either for the purposes of commerce, or from refuge of the storm.

Within the collection district of this port are included the harbors of Conneaut, Ashtabula, Grand River and Black River. The subjoined statement, kindly furnished me by the collector of customs, will give some idea of the amount of the coastwise and foreign commerce of this district for a single year, which pays tribute to the government. I also subjoin a statement of the gross amount of freight arriving here by the Ohio canal, and regret that I was unable to procure a similar statement from the different railroads concentrating here, but this I could not do, as their year terminates on the 31st of December, and their whole force is fully occupied in attention to their daily current business.

From the report of the collector it will be seen that the number of sail vessels belonging to this district amounts to 142. The tonnage to 33,173 tons, and the number of seamen to 994; of steamboats, the number of vessels is 22; the tonnage 14,037; number of seamen 580.

The number of vessels in the domestic trade, entered during the year was 2,479; tonnage 946,442; seamen 40,401; cleared 2,460; tonnage 1,930,472; seamen 40,250. In the foreign trade the number of vessels entered was 481; tonnage 64,692; seamen 3,593; cleared vessels 390; tonnage 51,724; seamen 3,041.

In the domestic trade the estimated value of merchandise imported was	$59,489,291
Cleared	35,552,573
Making a total of	95,041,864
In the foreign trade the estimated value of merchandise imported was	490,788,000
Exported	572,870,000
Total imports and exports, foreign and domestic.	96,105,522

By the Ohio canal the gross amount of freight arriving at Cleveland for the year ending October 1, 1854, was 319,745 tons, which, owing to the partial failure of the crops, the drought, which lowered the water in the canal, and the universal depression caused by the prevalence of the cholera, was less than that for the preceding year 23,975 tons; of articles exported, the gross amount was 59,375, being a decrease from that of the previous year, for the causes above referred to, of 5,281 tons.

A detailed statement of the various articles embraced in this abstract is attached.

Harbor of Black River.

Operations under the appropriation for this harbor have been confined altogether to the west pier upon which the light-house or beacon is situated; with the appropriation, 360 feet of pier has been rebuilt in

a depth of from five to seven feet beneath the surface, in a solid and substantial manner; nearly the whole of which is planked and finished. The appropriation running short, refuse ship plank were spiked upon the remainder, so as to retain the stone work within the cribs. The amount appropriated for this work was but $5,000, and $5,205 68 has been expended upon it, making an excess of $205 68 over the appropriation, which was supplied from the funds of the Light-house Board, the repairs being directly connected with expenditures on account of the light-house at the end of the pier. Some further repairs will be required to the west pier, including the rebuilding of the pier head, the detailed estimate for which is hereunto attached.

The east pier is much dilapidated, and a portion of it at the outer end, 300 feet in length, entirely gone, except two detached portions, which will require to be torn away. The rest of the pier to the shore, some 700 feet in length, can be repaired so as to last for many years, and an estimate is submitted for the purpose.

A pier head is imperatively demanded at this head of the pier for its protection, and is estimated for accordingly.

Notwithstanding the dilapidated condition of the piers, the harbor maintains a good depth of water, even at the present low stage of the lake; the soundings on the chart accompanying this report showing a depth of eleven feet across the entrance, which it maintains to the inside of the harbor, except where the stone from the old broken piers has been deposited inside the piers, or where obstructions have lodged, and not been carried away by the current, owing to its dissipation when it reached the point where the piers had disappeared.

The harbor is an excellent one, and only requires to be maintained to make it an important point for refuge to the navigation of the lakes.

Estimates were submitted with my annual report for 1853, for the completion of the repairs of this work, amounting to $22,344 50. A more careful admeasurement, resulting from a complete survey of the harbor, together with the consideration of increased prices for materials and labor since that estimate was made, has induced me to submit a revised estimate of the cost of this work, the details of which are attached.

Estimate for the repair of the harbor of Black River, east pier.

To rebuild 300 feet of pier, thirteen feet wide, from six feet below the surface	$6,324 00
To repair and partially rebuild from the water surface, 725 feet, same pier	6,500 00
To face up 225 feet on inner end of pier to prevent breach	862 50
For pier head, forty feet square in fifteen feet water, to rise nine feet above the surface	4,291 40
Total for east pier	17,977 90

West pier.

To rebuild 210 feet on inner end of pier	$2,340 10
To repair and face up 800 feet inside the harbor	4,000 00
To repair 125 feet north end of the pier	1,250 00
To rebuild pier head from surface of water, thirty-five feet square	2,433 60
Total west pier	10,023 70

RECAPITULATION.

East pier	17,977 90
West pier	10,023 70
Contingencies, ten per cent	2,800 16
	30,801 76

No estimate has been made for the extension of the east pier, as the harbor now answers all the purposes it was designed to effect. From the accompanying chart it will be perceived that the west pier extends considerably beyond it out into the lake, and should it, upon the restoration of the east pier, be thought desirable to extend it further, the building of the pier head can be deferred until the question be decided.

Harbor of Vermillion.

The repairs to this harbor were made for the Light-house Board, under order of the bureau, the reports being rendered to the Board. The amount available for the purpose was so very small that its expenditure has been directed simply to securing the end of the pier from further incursions of the lake; to securing the temporary beacon which had been erected upon its extremity; and to the construction of a temporary walk upon the old broken and decayed pier, to enable the keeper to reach his light without imminent risk of life.

The balance in my hands at the commencement of the season was $114, to which has been added the sum of $62.

The keeper's walk has been completed to the shore, and the gallows frame of the lantern secured. Nothing, of course, could be effected toward the repair of the pier with the limited amount of funds at my disposal. A detailed report will be made to the Light-house Board, to whom, by instructions from the bureau, directed me to report as to this work and that of the light-house pier at the harbor of Huron.

In my last annual report I submitted an estimate for the thorough repair of this harbor, amounting to $24,453 53. A survey of the locality made during the present season has enabled me to present one more in detail, and to embrace several items which were omitted in the cursory examination necessarily given to the work at that time for

want of a regular survey and measurement. The estimate now submitted, which is somewhat increased above that of last year, will, it is believed, cover the expense of a complete repair of the piers as far as they at present extend. A further extension was, I believe, contemplated by the former Board of Engineers, but I have no documents at hand to show me the extent. That the pier should be extended further into the lake will, I think, be evident from an inspection of the chart of the harbor, made from the survey of this season. The deepest water found by the soundings taken in August is little more than eight feet, although it is not doubted that the completion of the east pier, by confining and directing the current of the river in the spring, will sweep out the space between the piers, and materially deepen the water. There is, however, a ledge of slate rock on the west side of the harbor, beyond which the current cannot deepen the water, and it was originally contemplated to carry out the piers beyond the influence of this obstruction, which has a dip to the northeast. The present estimate does not contemplate this extension, but is confined simply to putting the piers, as they at present exist, into a complete state of repair.

Estimate of funds required for continuing the improvement of the harbor of Vermillion.

West pier.

To raise 125 feet of pier, twenty-four feet wide, five feet high	$2,035 68
To rebuild from the water edge 1,000 feet of pier	14,600 16
To face up 400 feet of pier, (inland)	1,000 00
Total of west pier	17,635 84

East pier.

To bring up ninety feet of pier to surface of the water	632 48
To rebuild 350 feet of pier from surface, six feet high, twenty-four feet wide	7,909 60
To face up and repair 740 feet, (inland)	3,700 00

RECAPITULATION.

West pier	17,635 84
East pier	12,242 08
Contingencies, ten per cent	2,987 79
Total for harbor of Vermillion	32,865 70

Harbor of Huron.

The appropriation for this work having been nearly exhausted by the operations of last year, but little could be done upon the east pier,

to which, by order of the bureau, the expenditure was confined. Three cribs have been put in, commencing at the inner end of last year's work, to prevent the washing of the sand into the harbor from the beach. The limited amount at command would only allow me to raise there cribs three feet above the water, but this will be sufficient for the present, and will materially aid in preventing the washing of sand into the harbor, the depth of which was rapidly decreasing in consequence. As reported last year, 210 feet at the outer end of this pier remains to be completed. A pier head will also be required for its protection. The inner end of the new pier will require to be extended inland 120 feet, and portions, also inland, will require facing up to prevent the drifting in of the sand, which is seriously injuring the harbor. The amount appropriated for this work (the whole of which has been expended upon the east pier) was $10,000, of which $9,192 19 had been expended on the 30th September, leaving a balance of $807 81, the whole of which will be needed this season for the work referred to above. The amount of work done with the appropriation has been 630 feet, rebuilt from an average depth of three and a half feet below the surface of the water, filled with stone and planked, and the putting in of three cribs inside of this work, as above mentioned For the west or light-house pier, the amount expended was furnished from the appropriation for light-house purposes, and was placed in my hands by the Light-house Board. During a heavy gale on the 30th of May, the beacon erected on the end of this pier, and which was an old and much decayed structure, was capsized by the violence of the wind, and precipitated into the lake. The beacon, in falling, so destroyed the integrity of the pier head, that it also was soon carried away by the action of the waves, to a depth of seven and ten feet below the surface. This was a fortunate circumstance, as the beacon was so much decayed and dilapidated that it was unsafe, and would not have been worth repairing. It had been determined also to tear away the old pier head, which was also in a dilapidated state, and to renew it in a more substantial manner. Operations were progressing at the time to carry this into effect. The action of the elements saved the time and expense of removal, and upon the old foundation a new and most substantial pier head has been constructed, rising to a height of nine feet above the surface of the water, connected with the pier head and dovetailed and bolted to it. Ninety feet of new pier has been constructed in an average depth of about eight feet, and carried up to a height of six feet, access to the pier head being secured by steps.

In the centre of the pier head a vacant space or bay has been left, which is to be filled with biton to the surface of the water, so as to form not only a foundation for the new beacon, but also a solid core or nucleus of stone, which will materially aid in the preservation of the pier head. The character of the workmanship of this pier head is of the very best and most substantial character, and reflects much credit upon the builder, Mr. Charles Wilbor, to whom I committed the charge of its construction. In the preparation of the foundation upon the old work, which was very irregular in deep water, and in a very exposed situation, he has evinced much skill, perseverance, and judgment; the result is a work which, for solidity and finish, will compare with any upon the lake. The whole amount received from the Light-house Board

has been $5,492 28, of which $5,239 71 had been expended up to September 30, leaving a balance of $252 57.

The top course yet remains to be placed upon the pier head, the timber for which has been prepared. This will be done next spring; the gales of autumn in the exposed position of this part of the work rendering it inexpedient to do so this fall. It will consume the whole of the balance in hand.

In my last annual report I stated that this pier was so much broken by storms that it would require to be renewed above the water its whole length, and three serious breaches would require to be repaired from a greater depth. The low stage of the water the present season has afforded opportunity, in connexion with the survey of the harbor which has been made, for a more thorough examination of the foundation of such parts of the old pier as still remain. The result is a conviction that it will have to be rebuilt its whole length from an average depth of five feet below the surface, and an estimate is accordingly submitted for this purpose. The inside of the harbor will also require some repair, which is also estimated for. The repair of this pier, which is the light-house pier, is indispensable. There is no communication with the beacon from the shore, except by boat, which in heavy weather is difficult, and not unfrequently impossible; so that the keeper has often to light his lamps in the morning in anticipation of the coming storm, lest he should not be able to reach his light in the evening. It is also necessary for the integrity of the harbor, and for the safety of vessels *after entering*, as it is wholly exposed to the full rake of both winds and waves for four hundred feet, from a breach of that length upon which the depth exceeds four feet.

Estimate of funds required to complete the repairs of the harbor of Huron.

West or light-house pier.

To rebuild the west pier, from five feet below the surface of the water:

1,200 feet of pier, 12 feet wide, to rise six feet above the water	$20,279 20

East pier.

To complete the east pier at the northern extremity by rebuilding 210 feet of pier upon the old foundation 8 feet below the surface	4,120 58
To construct a pier head 40 feet square in 15 feet water, to rise 9 feet above the surface	5,291 40
To rebuild 120 feet to connect the inner end of the east pier with the shore	1,831 84
To face up and repair 500 feet inside the harbor	2,500 00
	13,743 82

RECAPITULATION.

West pier	$20,279 20
East pier	13,743 82
Contingencies, 10 per cent	3,402 30
Total	37,425 32

The harbor of Huron is one of the best on the lake, being exceeded in capacity only by that of Grand River. The depth at a low stage exceeds twelve feet, which is maintained and even increased within the harbor, the entrance to which is 180 feet in width. The northern branch of the Cleveland and Toledo railroad passes through the town, and a branch of the Sandusky and Mansfield railroad terminates at the port, opening a direct communication with Bellefontaine, Springfield, Dayton, Cincinnati, and Indianopolis. The country in the vicinity abounds in oak timber of the finest quality, and ship building is extensively prosecuted. An abstract of the imports and exports of the port is attached to this report.

Harbor of Sandusky.

The operations at this work have been directed first to *building up* on the line of crib work constructed last year, which had, as was anticipated, settled in many places very considerably, the foundation being merely a bed of sand. The length of the crib work built last season was 657 feet, which has been extended this season 375 feet across a new breach which had taken place around the eastern end of the old work, and had formed a channel entirely across the point, sweeping out the sound to the depth of eight feet, and 150 feet in width. The character of this work is the same as that of the preceding season, namely, cribs twelve feet wide of round timber, well bolted, put down on a bottom of brush, and filled with stone. The length of the continuous work is therefore now 3,032 feet. Another breach still farther east has also been stopped in a similar manner by a line of crib 325 feet in length. This latter work is not connected with the long line of crib work, but distinct from it; and its position is designated upon the map of survey hereunto attached.

I have no reason to change the opinion expressed in my last annual report of the happy results attending the construction of this work; on the contrary that opinion is confirmed by the experience of this season. The work stood the test of the winter storms quite satisfactorily. It is true that some portions of the pier sunk in places considerably into the sand; but this was to be expected from the nature of the bottom, and so far from proving a disadvantage, has only added to its security, and was of all others the result most to be desired. It has, as far as it extends, formed a complete breakwater against the encroachment of the lake. Large banks of sand have formed on each side, which are beginning already to be covered with bushes, which, when grown, will have a tendency to increase the permanency and stability of the barrier.

The whole of Peninsula Point consists of a bank or spit of sand,

which is the only protection of the harbor against the lake. It is liable at all times to be destroyed or washed away in places by the action of the waves, which, having once made a breach through any part of it, will continue to enlarge the opening until the harbor is ruined. I am convinced, however, that the mode adopted for the prevention of such a catastrophe will prove perfectly effectual. But in order to render it so the artificial breakwater should extend the whole length of the point to its extremity, and should be *built upon* as it continues to sink, until it reaches a firm foundation beneath the sand cast up by the lake. The pier forms a core or nucleus around which the sand will continue to collect, and by preventing the formation of an incipient current across the point, will effectually put a stop to the occurrence of any more extensive breaches through it. With this conviction I have submitted an estimate for the extension of the work, upon the present plan, the whole length of the "Point."

The estimate for this extension is made *pro rata* from the amount expended by the agent upon the work already constructed; although I am of opinion, that by judicious management, and carrying on the work in connexion with that to be proposed, it can be done for much less. The tools, machinery of every kind, workshop, and boarding-house, have, of necessity, been purchased out of the appropriation already expended, and will, of course, be available for all future operations.

The amount appropriated for this work was $15,000, of which there has been expended $14,835 31, leaving a balance in my hands of $164 69. The larger portion of this sum was expended before I took charge of the work,

The most costly portion of this improvement, and without which the rest, although highly important, will be comparatively valueless, remains to be mentioned. Between the main land, and the small island, at which the work commenced last season, a cut or breach has been made, many years since, nearly 3,000 feet in width. A careful survey and sounding of this cut was made in August, in connexion with one of Peninsula Point, a chart of which is herewith submitted. From this it will be seen that the depth of water through the cut is from four to six feet. The bottom is sand, and any work across the beach may well be expected to sink to about an uniform depth, before it finds a solid foundation beneath the sand. This bottom or foundation is assumed to be eight feet below the surface of the water. It is proposed to connect, on a line indicated upon the chart, the small island above referred to with the main land by a pier, or breakwater of crib work, filled with stone, 2,700 feet in length, 20 feet in width, to rise six feet above the surface of the water, so as to form a permanent barrier against any further incursions from the lake. The situation is a very exposed one, and in times of high winds, the current rushes through the cut with almost resistless force, and with a velocity of three and four miles an hour. An attempt was formerly made to close this breach, by similar means, and a commencement was made at both ends, but the work was not finished, owing, I believe, to the absence of any further appropriation, leaving the middle of the breach, in the deepest water, entirely untouched. Being unsupported in the centre, the work was entirely destroyed by the waves, and there remains but one single crib connecting with the

main shore, to show that such a structure had ever been contemplated. A considerable portion of the north side of the small island, which was then covered with a forest of heavy timber, has also been washed away, leaving the lifeless bodies of the trees uprooted, and lying in the water. This process is still going on, and ere many years what still remains of the island itself will share the same fate and entirely disappear, or be converted into a bank of shifting sand.

The construction of this breakwater will be a work of considerable difficulty, owing to the uncertainty of the foundation, and the exposure of the work to sudden destruction by storms, before it can be connected from one end to the other. If undertaken at all, the appropriation for its construction should cover the whole estimated cost at once, that there may be no interruption or delay for want of funds, which proved so fatal to the first undertaking. An estimate of the cost is submitted, in compliance with the instructions of the bureau, with the expectation that both the plan and the estimate for its accomplishment will undergo the revision, and be subject to the better judgment of the Board of Engineers. An estimate is also submitted for connecting this proposed breakwater with that already constructed, by a short pier across the small island, similar in its character to that adopted for the protection of Peninsular Point.

Estimate for completing the improvement of the harbor of Sandusky.

For building an entire new pier, 2,700 feet long, 20 feet wide, and 14 feet high, to close the breach between Peninsula Point and the main land, 90 cribs of 30 feet at $900 per crib	$81,000
For connecting the above breakwater, across the island, with the pier already built, 450 feet of pier, at $4 50 per foot	2,025
To build 4,050 feet of rough crib-work, to complete the protection of Peninsula Point, to its extremity, at $4 50 per foot	18,900
Contingencies, 10 per cent	10,192
	112,117

The position and value of the harbor of Sandusky to the navigation of the whole chain of lakes, is too well known to require comment. Possessing a bay of noble expanse, land-locked on all sides, with sea room sufficient to afford shelter to an immense navy, all that is required to render it one of the noblest harbors to be found on these waters is an increased depth of water in the channel, connected as it is by innumerable railroad communications with east, west and south. The necessity, as far as practicable, of increasing its approaches by water must be apparent. I have been furnished by the local agent for this work with the following statistics relative to the trade and commerce of the port, procured, as he states, "from the custom-house and from the different warehousemen and railroad companies."

Value of imports coastwise, exclusive of express packages	$32,877,879 00
Value of exports coastwise, exclusive of express packages	25,070,259 00
Value of imports from foreign countries	90,055 00
Total value of imports and exports for the year ending September 30	60,038,193 00

Tonnage of vessels belonging to Sandusky:

Sail vessels	6,706
Steamers	1,179
Total for 1854	7,886

The agent adds: "the foregoing exhibit does not include the exports of stone from this port, which, during the last year, have been unusually large. The necessary information has not yet been obtained from the different establishments dealing in this article to enable me to state, with anything like exactness, the amount or value of this trade; it is, however, very large, both cut and rubble, and also limestone." The amount of duties collected for the last eight years, is as follows:

1846	$334 72
1847	553 22
1848	1,423 70
1849	11,152 00
1850	20,806 55
1851	33,841 20
1852	94,451 80
1853	53,591 92
1854	24,981 10
In bond	45,539 79
Total	70,523 89

The agent closes his communication by saying: "In connexion with the above exhibits, it must be borne in mind that the commerce and business of this port have been very much depressed the past season by the almost entire failure of the crops of northern Ohio. On the 30th of June scarcely a bushel of wheat or a barrel of flour had been shipped from this port for any market, whereas, ordinarily, these articles formed four-fifths, or nearly so, of our entire exports."

Harbor of Monroe.

From the very small balance on hand to the credit of this work, nothing has been done here during the past season. All that has been done under the appropriation was executed under the direction of the local agent, before the charge of the work was assigned to me. From

his report I learn that the south pier is completed 400 feet into the lake; the north, or light-house pier, has been rebuilt 700 feet, but is still in an unfinished state.

The amount expended by Mr. Darrah, the agent, was $11,500. That expended since I assumed charge of the work is $1,174 91, most of which was in liquidation of debts previously incurred for materials. There therefore remains a balance in my hands of $1,325 09, very little of which, however, will be available for the purposes of further repairs, being for the most part due; as soon as I receive the accounts from the agent I shall settle them at once. The north pier will still require extensive repairs.

In attempting to widen the pier, the north line of the cribs extending over the old work was placed upon the sand, whilst the corresponding timber on the south side rested upon the old work as a foundation. The consequence is that the whole of the upper work of a considerable portion of the pier inclines very much to the northward, from the insufficiency of the foundation on that side, racking it, and rendering further repairs necessary before the planking can be put down. The eastern end of the pier for 300 feet has not been touched, and will require to be wholly rebuilt from the water; about 500 feet of the new work which has been built will require, when finished, to be planked, for which there is a sufficiency of material on hand.

In accordance with the recommendation of the Board of Engineers, in their last annual report, I submit, in connexion with those for other portions of the work, the estimate made by them for the further extension of both piers into the lake a distance of 150 feet each, "out to the maximum draught of lake navigation, viz: twelve feet.

The present pier head is in a very dilapidated condition, but the foundation of the beacon being built upon piles within it and separate from it, no fears are entertained for its safety at present; should the extension of the pier take place the beacon would, of course, be removed to its extremity; an estimate is submitted for the construction of a pier head for its protection.

Estimate for continuing the repairs of the harbor of Monroe, Michigan.

North pier.

To rebuild from two feet below the surface 350 feet of pier eighteen feet wide	$7,083 96
To repair 200 feet and partially rebuild the same—200 feet at $5	1,000 00
Planking last year's work	310 00
For extending both piers 150 feet each, as per estimate of Board of Engineers	10,060 00
Construction of pier head for north pier	4,762 20
Contingencies, ten per cent	2,321 61
	25,537 77

The harbor of Monroe is situated in the collection district of Detroit,

the nearest port of entry being Toledo. It is the terminus of the Southern Michigan and Northern Indiana railroad. A continuous line of road now extends from this port to Rock Island on the Mississippi, a distance of 422 miles, with numerous branches entering at different points, bringing the productions of that great valley to this harbor for shipment.

The number of vessels cleared during the past year was 230; arrived 270. As far as I could ascertain from the report of the agent, the following are the principal shipments: staves 691,000, boat knees 10,012, wheat and corn 377,306 bushels, flour 79,069 barrels, lumber 766,936 feet, merchandise 20,000 tons.

The amount of duty collected within the district amounted to $50,000.

SUMMARY OF ESTIMATES.

Harbor of Conneaut	$12,984 81
Harbor of Ashtabula	31,918 04
Harbor of Grand River	15,004 56
Harbor of Cleveland	40,618 78
Harbor of Black River	30,801 76
Harbor of Vermillion	32,865 71
Harbor of Huron	37,425 32
Harbor of Sandusky	112,117 00
Harbor of Monroe	25,637 77
	339,373 75

H. STANSBURY,
Captain Topographical Engineers.

Col. J. J. ABERT,
Chief Bureau Topographical Engineers.

Estimate of funds required for continuing the improvements at the harbor of Conneaut, Ohio, during the year ending June 30, 1856. Transmitted to the general superintendent by the local agent.

16,800 feet of crib timber, at 14 cents per foot	$2,352 00
22,680 feet of ties, at 14 cents per foot	3,175 20
10,800 feet of long timber, at 14 cents per foot	1,512 00
16,200 feet of longitudinal cross ties, at 14 cents per foot	2,268 00
500 feet of posts, at 14 cents per foot	70 00
9,600 feet of plank, at $30 per M.	288 00
1,200 feet of boards, at $10 per M	12 00
950 cords of stone, at $5 per cord	4,750 00
4½ tons of iron for bolts, at $90 per ton	405 00
1,200 pounds of spikes, at $6 per hundred	72 00
1,950 days' carpentering, at $1 50 per day	2,925 00
800 days' labor, at $1 per day	800 00
450 weeks' subsistence, at $250 per week	1,125 00
Smithing	150 00
Stone scow	300 00
Crane scow	750 00
Contingencies, 10 per cent. on the above	2,095 42
	23,049 62

Estimate of funds required for continuing the improvements of the harbor of Ashtabula, Ohio, during the year ending June 30, 1856.

19,600 feet of crib timber, at 14 cents per foot	$2,744 00
27,460 feet of ties, at 14 cents per foot	3,844 40
12,600 feet of long timbers, at 14 cents per foot	1,764 00
18,900 feet of longitudinal ties, at 14 cents per foot	2,646 00
600 feet of posts, at 14 cents per foot	84 00
9,100 feet of plank, at $30 per M	273 00
1,500 feet of timber, at $10 per M	15 00
1,106 cords of stone, at $5 per cord	5,530 00
5½ tons of iron, at $90 per ton	495 00
1,500 pounds of spikes, at $6 per hundred	90 00
2,275 days' carpentry, at $1 50 per day	3,412 50
931 days' labor, at $1 per day	931 00
535 weeks' subsistence, at $2 50 per week	1,437 50
Smithing	200 00
Crane scow	750 00
Stone scow	300 00
Completing repairs of old pier	4,500 00
Contingencies, 10 per cent. on the above	2,901 64
	31,918 04

Estimate of funds required for continuing the improvements of the harbor of Grand River, Ohio, during the year ending June 30, 1856.

30,800 feet of crib timber, at 14 cents per foot	$4,312 00
40,780 feet of sawed ties, at 14 cents per foot	5,709 20
19,800 feet of long timber, at 14 cents per foot	2,772 00
28,700 feet of longitudinal and cross ties, at 14 cents per foot	4,018 00
913 feet of posts, at 14 cents per foot	127 82
14,300 feet of 3-inch plank, $30 per M	429 00
2,000 feet of lumber, at $10 per M	20 00
1,738 cords of stone, at $5 per cord	8,690 00
10 tons of iron, at $90 per ton	900 00
2,200 pounds of spikes, at $6 per hundred	132 00
3,735 days' carpentry, at $1 50 per day	5,602 50
1,463 days' labor, at $1 per day	1,463 00
825 weeks' subsistence, at $2 50 per week	2,062 50
Crane scow	750 00
Stone scow	300 00
Smithing	300 00
Contingencies, 10 per cent. on the above amount	3,758 80
	41,346 82

HARBOR OF CLEVELAND.

Estimate of funds required for continuing the improvements of the harbor of Cleveland, during the year ending June 30, 1856.

WEST PIER.	
1. For construction of a new west pier outside of the present dilapidated structure according to the estimate of the Board of Engineers, 750 feet in length—	
25 cribs, 30 feet long, 12 feet wide, and 16 feet high, at $600	$15,000 00
2 cribs, 30 feet long, 20 feet wide, and 16 feet high, at $820	1,640 00
Compensation for agent, 365 days at $4	1,460 00
Contingencies, 10 per cent	1,810 00
	19,910 00
2. For rebuilding old pier, 750 feet long, from an average depth of 4 feet—	
14,500 feet of timber at 14 cents	2,030 00
10,800 feet of ties at 14 cents	1,512 00
4 tons bolt iron at $90	360 00
300 cords stone at $5	1,500 00
Carpentry and labor	4,000 00
Contingencies, 10 per cent	940 20
	10,342 20
3. For connecting the new pier with the old—	
6,750 feet of long timber at 14 cents	945 00
7,596 feet connecting ties, at 14 cents	1,063 44
1½ tons of bolt iron, at $90	135 00
9,000 feet of ties for deck, at 14 cents	1,260 00
2,225 feet long timber, at 14 cents	311 50
1 ton bolt iron, at $90	90 00
36,000 feet 3-inch oak plank for deck, $30	1,080 00
Carpentry and labor	3,500 00
Contingencies, 10 per cent	838 49
	9,223 43
RECAPITULATION OF WEST PIER.	
Constructing new pier	19,910 00
Rebuilding old pier	10,342 20
Connecting the piers	9,223 43
Total for west pier	39,475 63
EAST PIER.	
1. For tearing up and removing the shattered end of the east (stone) pier, and rebuilding it from the water's edge—66 feet long, 16 feet wide, and 9 feet high—	
9,504 feet of masonry, (labor only,) at 50 cents per foot, materials on hand	4,752 00
Cramps, straps, and dowels	500 00
Tearing up old work	1,000 00
Contingencies, 10 per cent	625 20
	6,877 20
2. For tearing up the wooden platform in front of the beacon on the outer end of the east pier, and replacing it with a structure of masonry, to correspond with the rest of the pier, and to form a solid pier-head 59 feet long, 25 feet broad, and 13 feet high—	
17,700 cubic feet of masonry, at 75 cents per foot, including materials	13,275 00
Tearing up and removing old work	500 00
Contingencies, 10 per cent	1,377 50
	15,152 50

HARBOR OF CLEVELAND—Continued.

3. For removing crib surrounding foundation of beacon, and replacing the same with masonry, connecting it with the pier-head proposed to be built as above, 30 by 25 feet, 14 (the size of the present foundation of the beacon,) and 9 feet high—	
4,986 cubic feet of masonry, at, including materials, 75 cents	$3,739 50
Contingencies, 10 per cent	373 95
	4,113 45

RECAPITULATION.

EAST PIER.	
Repair of outer end of pier	$6,877 20
Replacing platform with masonry	15,152 50
Repairing foundation of beacon	4,113 45
Total for east pier	26,143 15
SUMMARY.	
East pier	26,143 15
West pier	39,475 63
	65,618 78
Deduct amount of appropriation on hand and available	25,000 00
Total amount of estimate	40,618 78

HARBOR OF BLACK RIVER.

Estimate of funds required for the improvements of the harbor of Black river, Ohio, during the year ending June 30, 1856.

EAST PIER.	
To rebuild 300 feet of pier, 13 feet wide, from 6 feet below the surface—	
7,200 feet of long timber, at 14 cents	$1,008 00
7,020 feet of sawed ties, at 15 cents	1,053 00
195 cords of stone, at $5	975 00
2 tons of iron, at $90	180 00
3,600 feet of plank, at $30	108 00
Carpentry and labor	3,000 00
	6,324 00
To repair and partially rebuild from the surface of the water 725 feet of same pier	6,500 00
To face up 225 feet on inner end of pier to prevent breach—	
2,025 feet of timber, at 14 cents	283 50
600 feet of ties, at 14 cents	84 00
½ ton of iron, at $90	45 00
Carpentry and labor	450 00
	862 50

HARBOR OF BLACK RIVER—Continued.

For pier head, 40 feet square, 15 feet water, and to rise 9 feet above the surface—	
9,360 feet of crib timber, at 15 cents	$1,404 00
209 cords of stone, at $5	1,045 00
2 tons of bolt iron, at $95	190 00
1,600 feet of plank, (3-inch) at $30	48 00
1,480 ..... do ..... do ... for outside, at $30	44 40
10 kegs of spikes, at $6	60 00
Carpentry and labor	1,500 00
	4,291 40
WEST PIER.	
To rebuild 210 feet on the inner end of west pier—	
3,360 feet of long timber, at 14 cents	470 40
2,856 feet of ties, at 15 cents	428 40
45 cords of stone, at $5	225 00
1,500 pounds of iron, at $90	135 00
2,310 feet of plank, at $30	69 30
2 kegs of spikes, at $6	12 00
Carpentry and labor	1,000 00
	2,340 10
To repair and face up 800 feet inside the harbor, at $5 per foot	4,000 00
To repair 125 feet, end of west pier	1,250 00
To rebuild pier head from surface of the water, 35 feet square—	
3,840 feet of timber, at 14 cents	537 60
42 cords of stone, at $5	210 00
800 feet of plank, at $30	24 00
1,800 pounds of iron, at $90	162 00
Carpentry and labor	1,500 00
	2,433 60

RECAPITULATION.

EAST PIER.	
Rebuilding 300 feet	$6,324 00
Repair and partially rebuild 725 feet	6,500 00
Face up 225 feet	862 50
Pier head	4,291 40
WEST PIER.	
Rebuild 210 feet inner end	2,340 10
Repair and face up 800 feet inside	4,000 00
Repair 125 feet north end west pier	1,250 00
Rebuild pier head from surface of the water	2,433 60
Contingencies, 10 per cent	2,800 16
	30,801 76

VERMILLION HARBOR.

Estimate of funds required for continuing the improvements of the harbor of Vermillion during the year ending June 30, 1856.

WEST PIER.	
For raising 125 feet 5 feet high—	
1,800 feet of timber, at 14 cents	$252 00
2,112 feet of ties, at 14 cents	295 68
90 cords of stone, at $5	450 00
2,600 feet of plank, at $30	78 00
1,000 pounds of spikes, at $6	60 00
Carpentry and labor	900 00
	2,035 68
To tear up and rebuild from the foundation of the waters edge 1,000 feet of pier, fill with stone and plank over, 24 feet wide and 5 feet high—	
15,000 feet of oak timber, at 12 cents	1,800 00
17,568 feet of oak ties, at 12 cents	2,108 16
5 tons of ¾ bolt iron, at $90	450 00
30 kegs of spikes, at $6	180 00
568 cords of stone, at $4	2,272 00
23,000 feet of 3-inch plank, at $30	690 00
Smithing	500 00
Carpentry and labor	4,000 00
1 crane scow	750 00
1 stone scow	350 00
Tearing up old work	1,500 00
	14,600 16
To face up 400 feet of pier (inland)	1,000 00
EAST PIER.	
To bring up 90 feet of pier to the surface of the water—	
1,080 feet of timber, at 14 cents	151 20
1,152 feet of ties, at 14 cents	161 28
1,000 pounds of iron, at $90 per ton	45 00
55 cords of stone, at $5	275 00
	632 48
To rebuild 350 feet of pier from the surface of the water 6 feet high and 24 feet wide—	
6,300 feet of timber, at 14 cents	982 00
7,440 feet of ties, at 14 cents	1,041 60
247 cords of stone, at $5	1,335 00
7,700 feet of plank, at $30	231 00
3 tons of iron, at $90	270 00
10 kegs of spikes, at $6	60 00
Carpentry and labor	4,000 00
	7,909 60
To face up and repair 740 feet inland, at $5	3,709 00

RECAPITULATION.

WEST PIER.	
Raising 125 feet	$2,035 68
Rebuilding 100 feet	14,600 16
Facing 400 feet (inside)	1,000 00
EAST PIER.	
To bring 90 feet to surface of water	632 48
Rebuilding 350 feet	7,909 60
To face up and repair 740 feet inland	3,700 00
Contingencies, 10 per cent. on the above	2,987 79
	32,865 71

HARBOR OF HURON.

Estimate of funds required for completing the improvements of the harbor of Huron.

WEST PIER.	
1. To rebuild the west pier, from an average of 5 feet below the surface of the water, 1,200 feet of pier, 12 feet wide—	
26,400 feet of long timber, at 14 cents	$3,696 00
22,080 feet of ties, at 14 cents	3,091 20
828 cords of stone, at $5	4,140 00
12,000 feet of 3-inch oak plank, at $30	360 00
6 tons of bolt iron, at $90	540 00
10 kegs spikes, at $6	60 00
Tearing up old work and clearing foundation	2,000 00
Smithing, carpentry, and labor	6,392 00
	20,279 20
EAST PIER.	
1. To complete the east pier, by reconstructing 210 feet of pier at the outer end, upon the old foundation, 8 feet below the surface of the water—	
5,880 feet of long timber, at 14 cents	823 00
4,872 feet of ties, at 14 cents	682 08
1½ tons of bolt iron, at $95	142 50
10 kegs spikes, at $6	60 00
170 cords of stone, at $5	850 00
2,100 feet of 3-inch plank, at $30	63 00
Carpentry and labor	1,500 00
	4,120 58
2. For pier-head, 40 feet square, in 15 feet water, to rise 9 feet above the surface—	
9,360 feet of long timber and ties, at 15 cents	1,404 00
209 cords of stone, at $5	1,045 00
2 tons bolt iron, at $95	190 00
1,600 feet of 3-inch plank, at $30	48 00
1,480 feet of plank for outside, at $30	44 40
10 kegs spikes, at $6	60 00
Carpentry and labor	1,500 00
	5,291 40

HARBOR OF HURON—Continued.

3. To rebuild 120 feet at the inner end of the east pier—	
1,920 feet of long timber, at 14 cents	$268 80
1,536 feet of ties, at 14 cents	215 04
45 cords of stone, at $5	225 00
2,400 feet of plank, at $30	72 00
1,000 pounds of bolt iron, at $90	45 00
1 keg of spikes	6 00
Carpentry and labor tearing up old foundation	1,000 00
	1,831 84
4. To face up 500 feet inside, at $5 per foot	2,500 00

RECAPITULATION.

Rebuilding west pier	$20,279 20
Completing east pier, outside	4,120 58
Pier-head for east pier	5,291 40
Rebuilding 120 feet, inner end of east pier	1,831 84
Facing 500 feet inside	2,500 00
Total for Huron	37,425 32

Estimate of funds required to complete the improvements to the harbor of Sandusky.

1. For building a breakwater to close the breach between Peninsular Point and the main land. Length 2,700 feet, width 20 feet, height 14 feet. The breakwater to have a tier of longitudinal timbers through the centre of its whole length.	
Estimate for one crib of 30 feet—	
30 by 3 by 14, 1,260 feet of long timber, at 14 cents	$176 40
62 ties by 20, 1,240 feet of ties, sawed, at 14 cents	186 00
30 pounds of bolt iron to 1 course by 14, 420 pounds, at 4½ cents	18 90
(30 by 17 by 14) 2,314, 4,826 cubic feet, 37 cords of stone, at $4	148 00
30 by 17, 510 feet 3-inch plank for deck, at $30	15 30
20 pounds spikes, at 6 cents	1 20
Smithing, carpentry, and labor	354 20
	900 00
90 cribs, at $900 each	81,000 00
2. For connecting the breakwater with the pier already built across the island—	
450 feet, at $4 50 per foot	2,025 00
3. To continue the protection of Peninsula Point by constructing—	
4,050 feet of rough pier to the extremity of the Point, at $4 50	18,900 00
	101,925 00
Contingencies, 10 per cent	10,192 00
Total for Sandusky harbor	112,117 00

HARBOR OF MONROE, MICHIGAN.

For continuing the improvements of the harbor of Monroe.

1. To rebuild from 2 feet below the surface 350 feet of pier—	
9,450 feet of long timber, at 14 cents	$1,323 00
7,514 feet of long ties, at 14 cents	1,051 96
338 cords of stone, at $5	1,690 00
6,300 feet of plank for deck, at $30	189 00
3 tons of bolt iron, at $90	270 00
10 kegs of spikes, at $6	60 00
Carpentry and labor	2,500 00
	7,083 96
2. To repair and partially rebuild 200 feet of present pier, at $5 per foot	1,000 00
3. To plank 300 feet—	
5,400 feet of plank, at $30	162 00
8 kegs of spikes, at $6	48 00
Carpentry and labor	100 00
	310 00
4. To extend both north and south pier 150 feet each, according to the estimate of the Board of Engineers	10,060 00
5. To construct a pier-head 40 feet square and 15 feet high, for the protection of the north pier and the beacon at its extremity—	
7,680 feet of long timber, at 14 cents	1,075 20
1,420 feet of ties, sawed, at 15 cents	213 00
2 tons bolt iron, at $90	180 00
145 cords of stone, at $5	725 00
1,200 feet 3-inch plank, at $30	36 00
8 kegs spikes	48 00
77 cubic yards concrete, (foundation for beacon,) at $5	885 00
Carpentry and labor	1,600 00
	4,762 20
	23,216 16
Contingencies, 10 per cent	2,321 61
Total for Monroe harbor	25,637 77

Statement giving a summary view of the coastwise and foreign commerce of the port of Cleveland during the year ending September 30, 1854.

Domestic trade.	Number of men.	Number of vessels.	Tonnage.	Foreign trade.	Number of men.	Number of vessels.	Tonnage.
Number, tonnage, and crew of sail vessels belonging to this district, September 30, 1854	994	142	33,173	Number, tonnage, and crew of vessels entered	3,593	481	64,692
Number, tonnage, and crew of steam vessels	580	22	14,037	Number, tonnage, and crew of vessels cleared	3,041	390	51,724
Number, tonnage, and crew of vessels entered	40,401	2,479	946,442	Value of merchandise exported			$572,870
Number, tonnage, and crew of vessels cleared	40,250	2,460	930,742	Value of merchandise imported			490,788
Estimated value of merchandise entered			$59,489,291	Amount of duties collected			143,437
Estimated value of merchandise cleared			35,552,573				
			$95,041,864				

D. M. CROSS, *Deputy Collector.*

COLLECTOR'S OFFICE, CLEVELAND, OHIO, *October* 1, 1854.

Abstract of the principal articles of import received at the port of Cleveland, via the Ohio canal, from October 1, 1852, to October 1, 1853.

Articles.	Measure.	Weight in pounds.
Flour.....barrels....	614,032	22,105,112
Pork.....do.....	13,456	4,440,480
Whiskey.....do.....	41,487	14,207,380
Corn.....bushels....	222,645	12,468,624
Coal.....do.....	4,924,018	344,681,260
Wheat.....do.....	2,290,295	137,417,700
Oats.....do.....	20,353	671,649
Butter.....	.....	1,726,870
Bag and furniture.....	.....	1,004,519
Bacon and pork, in bulk.....	.....	1,206,556
Cheese.....	.....	1,004,519
Eggs.....	.....	569,732
Green and dried fruits.....	.....	572,296
Glassware.....	.....	1,417,356
Lard.....	.....	758,896
Pig and scrap iron.....	.....	4,990,335
Railroad and bar iron.....	.....	7,658,694
Merchandise.....	.....	930,942
Nails.....	.....	7,308,920
Oil-cake.....	.....	81,221
Potter's ware.....	.....	2,309,968
Wool.....	.....	1,119,765
Sundries.....	.....	5,968,274
Hoop-poles.....number....	12,731	25,465
Staves.....do.....	25,442	50,084
Lumber.....feet....	1,137,123	3,411,369
Timber.....do.....	309,964	18,597,840
Stone.....	27,558	68,895,000
Wood.....cords....	4,786	19,144,000
Shingles.....number....	10,000	1,500
		784,572,990

Abstract of the principal articles of imports received at the port of Cleveland, via the Ohio canal, from October 1, 1853, to October 1, 1854.

Articles.	Measure.	Weight in pounds.
Flour ..... barrels....	351,602	75,996,032
Pork ..... do.....	42,583	14,052,390
Whiskey ..... do.....	26,781	9,642,200
Corn ..... bushel....	411,172	23,025,632
Coal ..... do.....	4,736,265	331,538,550
Wheat ..... do.....	558,520	33,511,200
Bacon and pork, in bulk	.....	726,912
Butter	.....	1,588,109
Bag and furniture	.....	566,718
Cheese	.....	881,448
Eggs	.....	329,400
Green and dried fruits	.....	424,850
Ohio glassware	.....	276,674
Pig and scrap iron	.....	6,149,155
Railroad and bar iron	.....	11,551,769
Lard	.....	896,555
Merchandise	.....	577,048
Nails	.....	6,190,463
Oil-cake	.....	248,546
Potter's ware	.....	4,203,247
Wool	.....	565,389
Ohio starch	.....	423,776
Sundries	.....	14,391,466
Timber ..... feet....	110,951	6,577,060
Stone ..... do.....	26,902	67,255,000
Wood ..... cords....	5,993	23,972,000
Lumber ..... feet....	1,313,187	3,939,561
		639,581,190

Abstract of the principal articles of export from the port of Cleveland, via the Ohio canal, from October 1, 1852, to October 1, 1853.

Articles.	Measure.	Weight in pounds.
Fish ..... barrels....	17,644	5,293,200
Salt.....	46,020	13,806,000
Coffee.....	.....	1,494,437
Crockery	.....	599,574
Gypsum.....	.....	2,997,570
Pig and scrap iron	.....	4,283,904
Railroad and bar iron.....	.....	21,698,145
Iron castings.....	.....	1,074,845
Leather	.....	410,177
Merchandise	.....	8,046,201
Marble.....	.....	1,735,031
Molasses	.....	1,226,631
Iron ore.....	.....	9,447,804
Sugar.....	.....	1,443,620
Powder.....	.....	404,805
Sundries.....	.....	10,131,821
Hoops.....	1,906,087	953,043
Shingles.....	8,004,596	1,200,689
Lumber	14,356,580	43,069,740
		129,317,237

Abstract of the principal articles of export from the port of Cleveland, via the Ohio Canal, from October 1, 1853, to October 1, 1854.

Articles.	Measure.	Weight in pounds.
Fish ..... barrels....	11,643	3,492,900
Salt.....	37,851	11,355,300
Wheat..... bushels....	30,433	1,825,980
Bag and furniture	.....	213,546
Coffee.....	.....	733,263
Crockery	.....	367,373
Grindstones.....	.....	294,763
Gypsum.....	.....	5,270,308
Pig and scrap iron	.....	1,602,813
Railroad and bar iron.....	.....	18,314,615
Iron castings.....	.....	1,254,395
Leather	.....	262,913
Merchandise	.....	6,563,837
Marble.....	.....	1,394,394
Molasses	.....	454,649
Nails and spikes.....	.....	576,733
Iron ore.....	.....	13,717,979
Powder.....	.....	912,911
Sugar.....	.....	758,149
Sundries.....	.....	13,146,999
Hoops.....	864,954	434,477
Shingles.....	6,822,500	341,125
Lumber ..... feet....	11,857,549	35,572,447
		118,741,882

Abstract of the principal articles of imports received at the port of Huron, Ohio, from January 1 to October 1, 1854.

Articles.	Quantity.
Merchandise.....tons.....	684
Coal.....do.....	220
Salt.....bags.....	8,398
Salt.....barrels.....	13,335
Water lime.....tons.....	710
Plaster.....do.....	3,556
Fish.....do.....	1,326
White lead.....kegs.....	640
Stones.....	359
Marble.....pieces.....	269
Leather.....rolls.....	25
Lumber, pine.....feet.....	1,685,000
Shingles.....	930,000
Laths.....	331,000
Shingle bolts.....cords.....	46
Ship spars.....	87

Abstract of the principal articles of export from the port of Huron, Ohio, from January 1, 1854, to October 1, 1854.

Articles.	Quantity.
Flour.....barrels....	9,605
Corn meal.....do.....	40
Pork.....do.....	370
Beans.....do.....	70
Eggs.....do.....	219
Dried apples.....do.....	45
Clover seed.....do.....	128
High wines.....casks.....	2,484
Smoked hams.....barrels....	16
Ashes.....do.....	75
Butter.....tons.....	35
Lard.....do.....	11
Grindstones.....do.....	44
Grindstones.....do.....	175
Feathers.....sacks.....	11
Tobacco.....hogsheads..	18
Wool.....bales.....	584
Wool.....pounds....	4,000
Wheat.....bushels....	20,205
Corn.....do.....	394,487
Oats.....do.....	130,848
Potatoes.....do.....	4,270
Live hogs.....	2,952
Sheep.....	1,580
Cattle.....	1,393
Lumber, black walnut.....feet.....	215,000
Lumber, oak.....do.....	164,000

APPENDIX E.

WASHINGTON, *September* 25, 1854.

SIR: Ill health has, until now, prevented me from making the annual report and estimates required by the regulations. They are respectfully subjoined:

Four snag boats were employed in the Mississippi, from the beginning of October until the 1st of February. Two in February and four in March, at an expense of $62,000. They removed the snags as completely as practicable between the mouth of the Missouri and Red river.

Two large snag boats were employed in the Arkansas, in February, and the small one from the 1st of March until the middle of July. Although the navigation was improved from Napoleon to Van Buren, much "snagging" remains to be done. The lightest of the boats is of too heavy a draft to be used to advantage in the Arkansas.

The four large snag boats worked in the Missouri, from the middle of April until about the 10th of June, clearing it of snags from the mouth to the neighborhood of Lexington—about three hundred miles. They were then stopped because the appropriation was exhausted.

The small boat, under direction of C. A. Fuller, United States agent, removed the snags between the Falls and mouth of the Ohio, in December, January, and part of February.

In the harbor of Dubuque, in the fall of 1853, the dredge boat was employed in enlarging and deepening the entrance, and the "new cut" was excavated *down* to water mark.

The dredging was resumed on the 19th of May, 1854, in the new cut, and continued, except two weeks, till the 2d of August, when the work was suspended by orders received from the bureau. During the two weeks excepted, the boat was employed in the harbor, on account of low water.

The surveys of the rapids of the Mississippi were completed, and proposals advertised for last fall—none were received, however, before the end of the working season. Contracts were made during the winter. The contractors commenced the work as soon as the state of the river permitted, and have already improved the channel in the Rock Island rapids materially. The work in the Des Moines rapids proves to be much more difficult than expected, from the great quantity of flint encountered.

In the fall of 1853, the Illinois was surveyed from its mouth to Copperas creek, one hundred and fifty miles, and a channel cut through Guilford bar. The work was resumed in April 1854; the survey continued to the mouth of the canal—the dredge boat, in the meantime, working on Naples flats. When the survey was finished the dredge boat was removed to Spring Creek bar, the one nearest the canal, and employed upon it and Hennepin flats until the 11th of July, when it grounded. The Board of Engineers of Lake Harbors and Western Rivers, recommend in their report of August 1st, 1854, the extension of the survey of the river to La Salle. This survey had been completed some time before the date of their report. They also

censure the imagined practice of dredging only at low water. All the dredging of this season has been done at the stages of water recommended by the Board as most favorable. The difference between their estimate and that of Major Long comes from the fact, that the latter considers the badness of the machine, frequency of interruption, and hardness of the bars.

In the Ohio river the appropriation has been expended on the Cumberland dam, dredging about Cumberland island, the repair of Captina dam, and examinations of the numerous works between the Falls and Pittsburgh.

Estimate for one year.

For the construction of two light-draft snag boats, two machine boats, two dredge boats, for the Mississippi and its branches. *See estimate of Board of Engineers..	$70,000
Continuing the improvement of the Mississippi below the rapids	60,000
Continuing the improvement of the Des Moines rapids	30,000
Continuing the improvement of the Rock Island rapids	30,000
Continuing the improvement of the Missouri	40,000
Continuing the improvement of the Arkansas	40,000
Continuing the improvement of the Illinois	20,000
Continuing the improvement of the Ohio	90,000
Causeway at Dubuque	20,000

Respectfully, your obedient servant,

J. E. JOHNSTON,

Superintendent western river improvements.

Col. J. J. ABERT,

Chief Topographical Engineers, Washington, D. C.

DUBUQUE, IOWA, *September* 1, 1854.

SIR: In obedience to your instructions, received the 10th ultimo, I have the honor to report the amount of work done this season in the improvement of the harbor of Dubuque, and also submit my estimate of the cost of completing the same, and the time required.

The accompanying sketch, full as my time would permit, will serve to illustrate the several points operated upon, and those remaining incomple for the improvement of the harbor.

After a few days dredging in the north cut through Bass island, the river being sufficiently elevated, operations were commenced in the new cut on the 19th of May, and continued with diligence until the 12th of July; when, in consequence of low water, the dredge was removed to the line marked A. B., where she operated as long as practicable. On the 27th of July, the river having arisen, operations were resumed in the new cut and continued successfully until the 2d of August, when the works were suspended according to instructions.

* I recommend the sale of the two boats now in use.

Dredging executed at Bass island			280	cub. yards.
Do.	do.	line A. B	1,195	do.
Do.	do.	new cut	15,045	do.
Total			16,520	do.

For the completion of the new cut there remain 25,000 cubic yards to be excavated, which can be accomplished during the ensuing autumn to low water mark, by contract, and with the dredge the spring following at an expense of $3,500

Excavating 5,000 cubic yards along south bank of cut through Bass island, can be accomplished during this autumn and the ensuing spring, at an expense of 700

For the enlargement of the Naples cut I estimate 23,260 cubic yards 3,000

"Outlet," 10,500 cubic yards 1,600

To be accomplished by contract at above water, and dredging during the ensuing season.

Total 8,800

In proceeding with the work it will be proper to complete the "new cut" first, as for effectual service at either entrance. It is necessary to provide elsewhere for the large and increasing intercourse with the harbor.

The early completion of the "new cut" will also have a tendency to impede the formation of a bar which has been deposited southeast from the "Outlet," and continues to accumulate northward as indicated by the dotted line C. D., and presents an impediment which threatens the availability of the harbor from the north in the lower stages of the river.

Having thus far reported, I would submit that removing the alluvion of each succeeding spring over the entire harbor would involve an annual expenditure far exceeding the good attainable.

The constant and considerable deposite from the drainage of the city into the harbor in the absence of a current to counteract becomes an important source of injury. And lastly, the water in motion by the action of steamboats passing to and from the harbor abrades the sandy banks, and furnishes, especially in low water stages, a copious deposit, are considerations that convince me of the incompleteness and instability of the plan of improvement, and induce me most respectfully to suggest the propriety of constructing a causeway from the landing at Dubuque harbor, along the south bank of the "Naples cut" and "Outlet" to intersect with the main river, where a wharf extending southward would afford the accommodation that is much needed in low water.

The harbor improved to the extent of the original design will afford facilities at least during the elevated stages of the river (five months from the middle of March) for a period of years that will justify its completion, but not maintenance.

The causeway will suffice for the remaining three months of the

shipping season, and be an initiatory step in that which I conceive to be the only true mode of improvement.

Your unexpected call compels me to be satisfied with presenting the total estimate of $20,000 for the construction of the proposed causeway, but should the plan meet with approval I can furnish detailed estimates and drawings when required.

Respectfully submitted by your obedient servant,

JOSEPH C. JENNINGS,
United States Agent.

Lieut. Col. J. E. JOHNSTON,
Superintendent W. R. Improvements, Louisville.

JACKSONVILLE, ILLINOIS, *August* 26, 1854.

SIR: In compliance with instructions received by me from you, I have the honor to submit the following as an answer to your letter of the 5th of August, requesting information in reference to the improvement of the Illinois river in the United States collection district of New Orleans, for the year commencing September 1, 1854, and ending September, 1855.

For the force necessary for the dredge-boat Gopher, No. 2, (or whatever boat may then be in commission,) for the months of September, October, November, April, May, June, July and August, eight months, it will require about $1,500 per month, or $12,000 to keep her in active service for the eight months specified above—or should two dredges be employed, the total amount would be about $22,000; or should the plan of light draught boats, reported lately by Major Long to you to receive the dredge apparata of the Gopher, be adopted, the first sum will be increased by the cost of construction of said boats $5,000, making the total $17,000, and a like disposition made of the dredge apparata at Dubuque and put upon the Illinois river, the latter total of $22,000 would be increased to $32,000. I make this double estimate, as it was contemplated at the commencement of the work on the Illinois river that the dredge at Dubuque should be transferred to it.

The improvement effected consists in the cutting out of Guilford bar on the lower part of the river, in the fall of 1853, making it easy for low water navigation.

In April of the present year, 1,870 cubic yards of shells were removed from Naples flats, when the boat was transferred to Spring Creek bar, the uppermost bar to be improved; from Spring Creek bar 1,500 yards were removed, making both comparatively easy of passage, but not to the extent contemplated. From thence the boat was removed to Hennepin flats, from which was removed 1,500 yards, when she grounded, and where she now lies waiting for a rise of the river.

The river business consists in the transit trade between the eastern collection districts and the west, via the port of Chicago, to the ports of Alton and St. Louis, and way trade of the river country in both directions. The passages of boats by the Gopher for the months of May, June, July and August, eastward, amount to 460 steamboats and 989 canal boats and barges of 120 tons average, being towed by steam-tugs;

this is for the trade passing eastward; the western way trade is independent of this.

In answer to your last enquiry as to the amount of commerce and navigation to be benefitted by this improvement, I would state that it is extremely difficult to give anything like a correct estimate. The most reliable information that I have been able to get upon this subject I have extracted from the message of Governor Mattison to the legislature of Illinois, made in January 1852. The governor, after speaking of the immense trade and rapid growth of the city of Chicago, goes on to state, that "the same has been the history of the region of country penetrated by the Illinois river—since the opening of the canal flourishing towns are lining its banks at every few miles distance, and are furnishing producers a ready and profitable market.

"This river being the connecting link between the Mississippi and the great chain of lakes, much care has been taken to ascertain its commerce as near as may be; the following table is believed to contain as near an approximate as can be obtained, still I am satisfied it is below the true amount." The governor then gives a table of the towns and amount of commerce of each town on the canal and Illinois river, and concludes on this subject as follows: "The total amount of commerce on the Illinois river and canal for the year ending November 30, 1852, was $42,345,000; number of steamboats from St. Louis and other points as high up as Peoria in same time 1,608; a large amount of trade on this route is carried on by canal boats and barges, towed by steamboats. Connected with this I may mention the fact that the arrival of steamboats at St. Louis during the past year have been between three and four thousand, and it is estimated by reliable judges that at least one-third are employed in carrying the products of Illinois."

I have no doubt myself that the estimate made by the governor at that time is far below the true amount now, but anything like an approximate to the amount cannot be given by me with my present information.

It will be seen, however, upon an inspection of the commercial report of the city of Saint Louis, of the first of January, 1854, that the trade of the Illinois river is of much more importance to that city than that of either the Missouri or upper Mississippi rivers.

Your obedient servant,

GEORGE A. DUNLAP,
United States Agent.

To Lieut. Col. J. E. JOHNSTON,
Sup. W. R. Improvements, Louisville, Kentucky.

OFFICE OHIO RIVER IMPROVEMENTS,
Louisville, September 1, 1854.

SIR: I have the honor to submit my second annual report on the state and progress of the "Improvement of the Ohio River, including the repairs of Cumberland dam," together with an estimate for the further prosecution of the work for the ensuing fiscal year.

My receipts and expenditures for the year commencing July 1,

1853, and ending June 30, 1854, on account of this service are as follows, viz:

Receipts.

Balance on hand July 1, 1853		$5,492 10
Remittance from United States Treasury, August 10, 1853.		10,000 00
Do.	do. do. 30, do.	13,000 00
Do.	do. September 15, do.	15,000 00
Do.	do. October 5, do.	14,000 00
Do.	do. November 16, do.	2,800 00
Do.	do. December 27, do.	3,200 00
Do.	do. January 21, 1854.	2,000 00
Total received		65,492 10

Expenditures.

Amount expended 3d quarter, 1853		54,401 13
Do. 4th do. do.		6,485 98
Do. 1st. do. 1854		1,860 48
Do. 2d. do. do.		752 50
Total expended		63,500 09
Balance on hand, June 30, 1854		1,992 01

At the date of my last annual report the snag boat, No. 5, (Terror,) the crew having been discharged, was lying in ordinary at Louisville, undergoing some repairs and necessary alterations, and in readiness to take advantage of the first rise in the river to enable her to pass the falls and to operate in the lower Ohio. From that time till early in November the boat remained in port, no opportuning presenting for a safe passage across the rapids. On the 10th the river having commenced rising, part of a crew was shipped, and the boat was employed in removing obstructions in the vicinity of the steamboat landing at Louisville, until the 18th, when she was enabled to pass over in safety.

The complement of officers and men was then completed, and in charge of Captain John K. Dillingham she commenced her voyage down the Ohio, removing all obstructions attainable at that stage of water. On the 5th of January, 1854, the river being very high and filled with ice, the boat was temporarily laid up at the mouth of Green river. On the 11th of the same month, a heavy rain having dispersed the ice, the boat was again started, but after removing two snags the weather turned extremely cold, the rigging becoming so frozen as to render it impossible to work the boat, and she was again laid up. On the 5th of February, the river being at flood height, and over its banks, with no prospect of an early resumption of operations, I discharged the officers and crew, and laid the boat up in charge of a custodian.

The amount of work done by the Terror during this short season is as follows:

83 snags raised and removed.
9 logs removed from bed of river.
12 roots and stumps blasted and removed.
4 sunken flat boats raised and removed.
153 impending trees felled.

Some of the work done was very heavy, one large sycamore snag in Hurricane island chute required four days constant labor to remove it.

On the 22d February, the Terror was turned over to Lieutenant Colonel Johnston, Topographical Engineers, for service in the Arkansas river.

Cumberland dam.

On the first of September, ultimo, I reported the work at this locality as being prosecuted with vigor by the contractor, Mr. R. Swan. On the 20th of the preceding month (the date of the last report received from the supervisor) 17,659 tons of stone had been deposited along the line of the dam; on the 24th September, I was constrained to suspend the work for want of adequate funds; to complete it 31,521 tons of stone had been deposited by the contractor up to that date; this amount, however, only proved sufficient to close the V or gap permanently, to raise the dam between the V and the bar at the head of Cumberland island to the required height, to extend the dam on the dry bar about 120 yards, and partially to elevate the portion of the dam between the V and Dog island.

The work remaining to be done consists in furnishing the portion between the V and Dog island, and in extending the dam along the dry bar to the head of Cumberland island, a distance of about five hundred yards, which will require, in all, about fifteen thousand tons of stone.

My report of the 4th October last explains the reasons why so much larger an amount of stone is required to complete the repairs than called for by the original estimate, and to which I take leave to refer.

The effect of this work, although but partially completed, has been already to open an uninterrupted low-water communication with the Cumberland river, via the Kentucky chute, at the head of the island; through which, at the date of the survey in 1848, no water whatever passed; but, on the contrary, a sand-bar, elevated some two or three feet above the low-water surface of the river, occupied the whole chute.

At the foot of the island, however, much difficulty has been experienced by boats in effecting a passage out to the old channel. The sand at the head, which has been cut out by the increased volume of water forced the chute by the dam, was deposited at and near the foot by reason of the spreading of the water towards the Illinois shore. I have already suggested that a jetty be constructed, extending downwards from the lower point of Cumberland island a sufficient distance to remedy this evil. From my present knowledge of the locality, I am of the opinion that it would require from eight to ten thousand tons of stone for this jetty. A careful examination and survey will be made

during the present month, on the results of which I will be enabled to make a detailed report and estimates.

During the present season of unusually low water, the channel on the Kentucky side of the island, throughout its entire length, is navigable for all boats that can approach it, either from above or below. I have, as yet, heard of no boats grounding there, while we have daily reports of their detention on other bars in the vicinity; and I feel confident, that whenever the dams shall be completed, the obstructions to the low-water navigation of this locality will be totally removed.

The dredge-boat Gopher operated very successfully in the chute at the head of the island; at the foot her operations were very much impeded, and at times rendered impracticable, by the grounding of steamboats, directly where her services were most needed.

On the 22d October, by order of Lieutenant Colonel J. H. Long, then superintendent of western river improvements, the dredge-boat, with the scows, &c., pertaining to the same, was turned over to the agent for the improvement of the Illinois river, in whose charge she still remains.

During the present year I have made reconnaissance of the different localities on the upper Ohio, at which works have been commenced, and in some cases completed, for the improvement of the numerous shoals in that part of the river. Of the beneficial effects resulting from these works, even in their unfinished state, frequent reports have been made to the bureau, and I deem it unnecessary now to recapitulate them.

There is one locality, however, deserving special mention, viz: that of Captina island, which was formerly the shoalest point below Wheeling, and, in fact, considered the head of low water navigation.

In 1838, Major John Saunders, corps of engineers, then superintendent of the Ohio river improvements above the falls, caused a dam to be built across the Virginia chute of the island, to throw an increased volume of water down the Ohio side, and by this means to work out a portion of the gravel bar, and to deepen the channel. The result proved the complete success of the method of improvement; the new channel was of sufficient depth to permit the free passage of any boats that could reach it from points either above or below, and has not only proved thus far beneficial to the navigation, but has been of permanent utility till within one year. From natural causes, assisted perhaps by interested parties, (not unusual on the upper Ohio,) several large breaches have occurred, through which a large portion of the river has again found its way, thereby reproducing the shoal in the channel, and rendering the navigation difficult. On my visit to this locality in June last, at a three feet stage of the water, there was eight inches less water in the channel than at Buffington's or any other shoal-bar below. Boats were either compelled to lie up at this point, or to lighten over. During the immediate repair of this dam, required by the exigencies of the case, I have caused the breaches to be filled, so far as the limited means in my possession warranted. The repairs were completed a few days since. About eighteen hundred tons of stone were placed in the dam—sufficient to stop the passage of water through the Virginia chute—although

probably not enough to render the dam as perfect as when first completed.

The construction of the several other works, as reported by me on the 1st September last, remains about the same as at that date. Buffington's island still offers one of the most serious obstructions to the navigation above Cincinnati, and Warsaw bar below. A detailed estimate for the repairs and completion of these works (with the exception of Warsaw bar) has already been presented, under date of May 3, 1854, to which I take leave to refer.

The river being now at a suitable stage, I propose to make an examination and survey of Warsaw bar immediately, the report and estimate for which will be duly forwarded.

My report, drawings, and estimates, for the improvement of Marietta harbor and vicinity, made by direction of the topographical bureau, were forwarded on the 7th November last, to which I would respectfully refer for information on the subject.

The snag-boat Terror, which has been employed in removing obstructions on the Ohio river, is not suitable for its purpose, being much too large and of too great draught. A light draught steam snag-boat, with a single hull, and of such dimensions as would enable her to be passed through the locks of the Louisville and Portland canal, will be required for this service, together with a machine-boat, worked by manual labor, to accompany and co-operate with the same, and designed to operate on the edges of channels and on bars beyond the reach of the steam snag-boat.

The same objection, viz: that of too great draught, applies to the dredge-boat Gopher. The dredging apparatus of this boat performs admirably, but the weight of the machinery for propelling her through the water, together with that of the water-wheels, guard, &c., is so great as to make her draught exceed the maximum depth in the low-water channels. A dredge-boat can be worked to great advantage on this river, and I shall submit an estimate for the construction of one of light draught, and suitable for this service.

The works designed for the improvement of the Ohio river are of such a character, being combined with dredging, snagging, &c., that no estimate can be made of the amount required for the completion thereof.

In submitting the following estimate, for the ensuing fiscal year, I ask only for an amount that can be judiciously expended during the year, and one which I trust Congress will have no hesitation in allowing.

Estimate.

For the completion, repairs, and preservation of works on the upper Ohio, as per detailed estimate of May 3, 1854	$115,000 00
For the completion of the works at Cumberland island	30,000 00
For snagging, dredging, and other improvements, not included above	40,000 00
For contingencies, say	5,000 00
Amount required	190,000 00

To which may be added an estimate for the construction and outfit of boats particularly adapted to this river.

For 1 light draft snag-boat, complete	$20,000 00
For 1 machine-boat, complete	3,000 00
For 1 dredge-boat with scows, complete	14,000 00
Amount for construction	37,000 00

Respectfully submitted,

CHARLES A. FULLER,
U. S. agent and engineer Ohio river improvements.

Col. J. J. ABERT,
Chief Topographical Engineers, Washington, D. C.

OFFICE WESTERN RIVER IMPROVEMENTS,
Keokuk, September 9, 1854.

SIR: Your letter of August 1st, calling my attention to the annual report to be made, was duly received. I have been somewhat delayed in obtaining certain information called for by you, and I have now the honor to submit the following report:

In the month of April 1853, I was appointed by the Secretary of War, United States agent for the improvement of the Des Moines rapids of the Mississippi.

I reported for duty immediately to Lieut. Col. Long, who, by order of the 1st of June, directed me to co-operate with Captain J. Barney, United States agent, and Lieut. G. K. Warren, Topographical Engineers, in the survey of the Des Moines and Rock River rapids, in order to determine the best and the most economical channel of improvement.

In consequence of ill health and other reasons, I did not participate to any considerable extent in execution of the surveys, and they were completed, and the maps, drawings, and report, were submitted by Lieut. Warren.

I concur generally in the views of the work as expressed by Lieut. Warren; but my experience in the work already shows that his estimated quantity of excavation is not sufficient, for the reason assigned by him, the necessity of removing the whole of each stratum of stone, when only a portion might suffice for the required depth. One-third might be fairly added to his estimates of quantity.

As soon as Lieut. Warren had completed the surveys and maps of the "Lower and English Chain" of the Des Moines rapids, to which the appropriation confined the expenditure of money, I advertised thirty days for bids to contract for the execution of the work.

Upon opening the bids on the 20th day of November, no satisfactory bids were found, and they were accordingly declined.

On the first day of February you ordered me to repair to Louisville to effect a contract, if possible, with parties offering to do the work.

A very favorable contract was obtained with Messrs. Robert Swan & Co., of Alleghany city; they having agreeed to remove all the ob-

structions to navigation which might be required, for the sum of $5 85 per cubic yard of rock removed.

They were delayed in their preparations for the work, and about two months in the spring of very low water was lost.

They, however, completed their arrangements and commenced the work at the first low water of August, and have prosecuted it with energy and success, but they have not employed as many hands, nor worked on as many points as I intended.

The effect already produced by the work on Campbell's chain, places the efficacy and practicability of the plan beyond a question of a doubt.

I will now proceed to answer your inquiries in the order they are put, as near as practicable.

1. Estimate of the entire cost of the channels through the rapids.....$1,500,000 00
2. The amount that can be expended profitably next year..... 200,000 00
3. Nearest port of entry at which any revenue is collected is St. Louis. Amount of revenue collected to January 1st..... 289,260 44
   Amount collected for the month, August, 1854..... 102,648 60
4. Amount of work done up to this date, about 850 cubic yards.
5. Amount of commerce and navigation to be benefitted.
   A low estimate of the value of produce and merchandise passing over the rapids annually.....35,000,000 00
   Extent of navigation to be benefitted, 2,000 miles.

There are about forty steamboats employed in the trade over the rapids. They will average about two hundred tons freight to the trip, and they make about fifteen trips per year.

There are also about thirty "lighters" employed in transporting freight over the Des Moines rapids, and each trip of the lighter will cost the steamboat about fifty dollars.

Thus the additional cost on freight over the rapids, including the cost of delays and damages to steamboats, may fairly be set down at five hundred thousand dollars per annum.

It will require at least six of the most favorable seasons to accomplish the whole of the work contemplated.

The labor will be applied at most difficult points first, so as to relieve the navigation as much as possible until completed.

From the facts I have stated, no one can fail to see the commercial importance of improving the rapids of the Mississippi, flowing through a country unequalled in fertility, unequalled in the rapidity of population; unsurpassed in the energy, industry, and productiveness of the population, it would be difficult indeed to calculate the increased commerce and the increased importance of the work twenty years hence.

Very respectfully, your obedient servant,

JOHN G. FLOYD, *U. S. Agent.*

Lieut. Col. J. C. JOHNSTON,
Top. Eng., Sup't W. R. improvements.

APPENDIX F.

OFFICE OF BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS.
Washington, February 18, 1854.

SIR: I am instructed by the Board to make the following report in relation to the plan and estimate for improving the harbor of Sodus bay, Cayuga county, New York, proposed by the superintending engineer, Brevet Colonel Turnbull, of the corps. A plan and estimate for the work was made by the same officer in 1845, but on the 17th September, 1853, he informed the bureau that the entrance had so changed since the time of the original survey, it would be useless to undertake the work on the plan first proposed, and he therefore suggested the propriety of making new surveys and plans for the site—these having been executed under the authority of the bureau, furnish the subject of the present report.

Although the plans proposed in 1845 differ from those now recommended by him, a careful study of them will shew that they have a general conformity of design; for the changes now proposed by Colonel Turnbull are mainly changes of detail, such as are necessarily suggested by the alterations which have taken place in the form of the shores since 1845, and by his more certain knowledge of the danger to which the beach, separating the bay from the lake, is exposed during the high stages of water.

The propriety of defending the beach had already been admitted by the Board, and an estimate for it was inserted in the general annual estimate.

Colonel Turnbull, however, suggests the substitution of a rip-rapping or deposit of shingle, instead of a row of piles, as proposed in the general estimate, and this substitution the Board approves, because of its greater economy and durability.

The works now proposed for the navigable entrance to the harbor, are in effect the same as those proposed in 1845; only that it is not deemed to be certainly *necessary* to carry the parallel piers, forming the entrance, to so great a distance into the lake as was contemplated at the time of the original plan.

In conclusion, the Board has very respectfully to advise the bureau to approve of the plan now proposed by Brevet Colonel Turnbull, for the improvement and protection of the Sodus bay, Cayuga county, New York.

It may be well, nevertheless, to remark, that while the Board sees no objection whatever to the proposed direction of the piers near the shore, it apprehends that it may possibly be found expedient to give to the outward end of the west pier a greater cant to windward. This idea is predicated upon the assumption that the greatest storms at this place proceed from the northwest. The *precise bearing*, however, that should be given to the outermost cribs, can be determined only after matured and critical observation, continued for a longer time than it has

been possible yet to give to the direction and effect of the storms at the particular locality.

Very respectfully, I have the honor to be, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Eng., Pres't Board.

Colonel J. J. ABERT,
Chief of Bureau Topographical Engineers.

Respectfully recommended to be approved.

J. J. ABERT,
Colonel Corps Topographical Engineers.

This plan is approved only so far as the necessary work can be completed with the means at the disposal of the department, or supplied by parties interested, for their own benefit. No work will be undertaken that will require further appropriations by Congress to complete it or render it effective.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *February* 25, 1854.

OFFICE BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, February 21, 1854.

SIR: In relation to the subject of Captain Macomb's letter of the 17th instant, referred to this Board, I have very respectfully to make the following explanation: Captain Macomb states that an important item for the proper conducting of the lake survey has been omitted in the estimates published by Congress—namely, the estimate submitted by him, of $50,000, for a new iron steamer; the reasons for providing which are given in his annual report to the bureau. The Board replies to this, that the annual report and estimates of Captain Macomb were dated at Detroit the 25th October last, and that the annual estimates of this Board were reported to the bureau on the same day, viz: the day limited for such reports, and that hence they had passed out of its hands before the estimates of Captain Macomb could have been known to it.

The Board, while occupied with its estimate for the survey of the lakes, had before it the estimates of Captain Macomb for the preceding year. It had statements of the annual cost and progress of the work for several other preceding years, and it had also the especial experience of one of its members, who had directed the work in the field. With the help of these elements, the Board was enabled to estimate, with sufficient precision, the probable sum required for the ordinary service of the coming year—the only service that the Board had in contemplation when it framed the estimate, as will appear by reference to the Senate's printed copy of the President's annual message, part 3, page 196.

Immediately upon Captain Macomb's annual report reaching the bu-

reau, it was referred to this Board. But the Board having already reported the annual estimates, it did not feel itself warranted in re-opening the subject with reference to any of its details, the subject had passed out of its hands. Nevertheless, the Board deemed the item for the new steamer, proposed by Captain Macomb, of such importance to the due progress of the survey of the lakes that it ought to be kept in view—and for this reason, with the permission of the bureau, it added to its own item for the survey of the lakes the remark which will be found in the document already referred to, namely, the remark that the "estimate does not include the cost of an additional steamer."

The Board does not hesitate to recommend an appropriation of $50,000 for a new iron steamer for the survey of the lakes. The one now upon that service has been in use some nine or ten years, and has rendered good service to the work. Vessels employed upon this kind of duty are exposed to severe usage; they are frequently aground, and are more liable to be damaged than are vessels employed in commerce. The Board, therefore, does not doubt that the steamer belonging to the lake survey must, by this time, require very extensive repairs, and it is of opinion that they ought to be authorized.

The Board is of opinion also, that there ought to be more than one vessel, of suitable tonnage, employed upon the work; because, while in deep soundings and upon dangerous coasts, the work requires the full service of a steamer to carry it on, with safety to the operatives and with the requisite dispatch—and, above all, indispensably for the astronomical and geodetic part of the work, another should be provided for carrying supplies and conveying orders to, and in transferring from place to place parties that may be operating at points very remote from each other, as they often are, even now, and as they will be, to a much greater extent, when the work will have reached Lake Superior, as it is reasonable to expect it will ere long.

I subjoin, for the information of the bureau, a copy of Captain Macomb's letter of the 17th instant, also, an extract from Captain Macomb's annual report, and a copy of the item of the Board's annual estimates, to which he refers.

I have the honor to be, respectfully, sir, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Eng., Pres't Board.

Colonel J. J. ABERT,
Chief Bureau Topographical Engineers.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, March 15, 1854.

SIR: In consequence of failure on the part of contractors to deliver materials at Milwaukie, no pier work has been put up there, and as there was adequate time, the Board was desired to revise the plan for the improvement of that harbor.

The law on this subject, quoted by the Board, expressly directs the appropriation then made "to be expended at a point of the Milwaukie river known as the 'North Cut,' surveyed by Lieut. Center."

This survey was made in 1836, and will be found printed as Senate document, No. 173, 2d session 25th Congress.

The estimate of this survey is	$92,184
The appropriation of 1852 was for	15,000
Leaving as a further amount to be supplied	77,184
The revised estimate of the Board is for	59,525
Appropriation of 1852	15,000
Leaving as a further amount to be supplied	44,525

The reduction in the estimate of the Board arises chiefly from stopping the piers at twelve feet lake water instead of extending them to fourteen feet, and in dispensing with the pier heads, both of which variations are in accordance with our experience in such structures.

The Board has also considered the necessity and propriety of repairing what is usually called the old pier work—that is, the pier work at the old entrance—for which the Board has submitted an estimate of about $10,000.

Fully agreeing with the views of the Board, it is recommended that the plan be approved.

On consulting with the Board, the following order and mode of performing the work is recommended:

First. That the work should commence at the north pier, which should be extended to the desired length, or nearly so, before the southern pier is begun.

Second. That in the extension of the southern pier care and observation should be observed, which may probably lessen its proposed length, the object being to insure an entrance of not less than twelve feet between the piers.

Third. That each pier, at its origin with the shore and extension into the lake, should not be less than twenty feet wide, and should be raised, for deck or platform surface, not less than five feet above ordinary level of lake water.

Fourth. That no excavated material should be used as pier ballast, or be thrown upon the piers.

Fifth. That in decking or flooring the piers, plank three inches thick, and not more than six inches wide, be used, and be laid not nearer than two inches of each other.

Sixth. I am clearly of opinion (in which opinion the Board unites) that the two entrances should be preserved, and that no obstruction or hindrance to either should be erected.

Seventh. Great labor and care have been bestowed upon the plan for this harbor. I am not disposed to think that any lake harbor has received more.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Colonel Corps Topographical Engineers.

Hon. JEFFERSON DAVIS,
Secretary of War.

The $15,000 appropriated by Congress must be expended upon the north cut in the manner most conducive to the object to be obtained, without reference to any appropriation hereafter.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *April* 6, 1854.

BOARD OF ENGINEERS, LAKE HARBORS AND WESTERN RIVERS,
Washington, March 4, 1854.

SIR: I am instructed by the Board to make the following report in relation to the improvement of Milwaukie harbor:

The appropriation for the work (August 30, 1852) is in the following words, viz: "For continuing the improvement of the harbor of Milwaukee $15,000, to be expended at the point on the Milwaukee river known as the 'North Cut,' surveyed by Lieut. Center."

There have been various other sums appropriated, from time to time for the improvement of Milwaukie harbor—these have been applied to the old, or natural entrance of the river.

Also, the Board has had heretofore before it, for investigation, the "subject of the position of the Milwaukie piers," and it has reported that, in its opinion, the existing outlet of the Milwaukie ought to be adhered to.

This opinion the Board still holds, and believing it to be possible, also, to keep open the north cut—to maintain the navigable bed of the river below that cut, and to improve the old outlet at the same time—it has to propose, with that view, the construction of the usual parallel piers of timber and stone for the "north cut," at the point indicated in the report of the local agent, of September 22, 1853.

The in-shore end of these piers to have the form and position least least liable to interrupt or disturb the existing currents at the position, nearly, which is shown in the drawings which accompany this report.

The piers to bear N. 81° E., to extend 800 feet into the lake to 12 feet depth of water, and to be 20 feet wide and 260 feet apart.

The agent ought to be enjoined not in the least to encroach upon the channel of the river. Moreover, the Board has indicated approximately, by dotted red lines upon the drawing, near the upper and lower entrance, the limits beyond which incroachments upon the stream or upon the land ought not to be permitted, without the express sanction of the bureau. Supposing, however, that any injunction to this effect, directed to the property-holders near the proposed improvement, would be nugatory, if proceeding from the authority of the United States alone, the Board has very respectfully to suggest that the city authorities of Milwaukie be notified of the expediency of some legal enactments respecting the boundary, or border, of the river, within its corporate limits, and the same as to the State authority, beyond the city limits, and also respecting individual encroachments upon the piers and the approaches to them.

Accompanying this report is an estimate of the cost of the works proposed. It does not include, however, the cost of any works for the re-

gulation of the currents inside of the piers, except so far as the indications of such an intention is shown upon the maps; and, moreover, it does not include the cost of any dredging, or other process of deepening the channel of the river, the item in the estimate for dredging being limited to the work necessary to connect the navigation of the lake with that of the river.

But I have very respectfully to say, that the Board anticipates the probable necessity of the occasional employment of a dredger, but to a limited extent, in order fully to insure the maintenance, or the perfecting, of the navigation of the channel of the lower portion of the river, or that part of it that lies between the present outlet and the proposed cut.

This part of the improvement, however, as it lies inside of the harbor, will, probably, fall to the lot of the city of Milwaukie, to execute.

In connexion with the general subject of the improvement of the harbor it may be proper to state, that the works, at the present outlet, require repairs, and the annexed estimate for that object is derived from Major Bache, a member of the Board, who inspected the work last summer.

The Board has had for its guide the chart of 1853, (No. 2,) upon which was projected the plans of H. W. Gunnison, esq., the local agent for that year; but it ought to remark that this chart differs from the charts made in 1844 and 1845, not only in the soundings, where changes might be reasonably anticipated, but in the form of the shores, near the proposed "cut," where we should look for some degree of permanency, or, at least, where the actual form of the shores is of great importance, and where that form should be exhibited with a considerable degree of precision.

Owing to this want of agreement of the charts, the Board has deemed it advisable to submit a copy of that of 1845, as well as that of 1853, with the plans of the proposed work projected upon it, so that the one which best conforms to the actual figure of the ground may be used in laying out the works.

The direction given to the piers, although it does not exactly fulfil all the conditions that could be wished, is, nevertheless, not at all seriously objectionable.

The choice of the direction given to them, namely: N. 81° E. was dictated by the fact that the proposed work, lying in the bottom of an open bay, which receives the storms nearly equally from the NE. and SE. points of the compass, forced the Board to adopt, for the direction of both the piers, the one which should enable both of them to receive the storm at angles similar to each other, whether they come from the NE. or SE.

It has been usual to give to the windward pier, in a structure of this kind, a greater extension than that of the leeward pier, so as to afford protection to vessels as they enter. In the present case, it is doubtful whether either of them is the windward pier. For this reason, therefore, both piers have an equal length, and the windward one may at

any time be lengthened, if, in fact, either of them should prove to be a windward pier.

Respectfully submitted.

JAMES KEARNEY,
Lieut. Col. Top. Eng., Pres't Board.

COL. J. J. ABERT,
Chief of Bureau Topographical Engineers.

Estimate for building piers at the North Cut at Milwaukie, Wisconsin, viz:

2 piers each, 800 feet long, 1,600 feet, and 20 feet wide to a depth of 12 feet water—	
24 pine side pieces, 12 feet by 12, 31 feet long, 744 feet, at 10 cents	$74 40
12 pine centre stringers, 12 feet by 12.....360.....do	36 00
36 pine ties, 12 feet by 12, 20 feet long.....720.....do	72 00
8 botton timbers, 12 feet by 12, 30 feet long...240.....do	24 00
730 pounds 1½-inch round iron for bolts, 3 inches long, 4½ cents	32 85
42 cords of stone, at $6	252 00
Carpentry and labor	45 00
	536 25
54 cribs, 30 feet long, at $536 25	28,957 50
80,000 board measure 3-inch pine plank, at $14	1,120 00
1,334 pounds 6-inch spikes, at 7½ cents	100 05
	30,177 55
116,380 cubic yards of dredging, at 12½ cents	14,547 50
	44,725 05
Contiugencies, 10 per cent	4,472 50
	49,197 55

Estimate for protecting the sides of the North Cut at Milwaukie.

North side of cut 190 feet in length, of crib work, 10 feet high and 12 feet wide; 395 in length of piling—	
30 side pieces, 12 feet by 12, 31 feet long, 620 feet, at 10 cents	$62 00
30 ties, 12 feet by 12, 12 feet long.....360.....do	36 00
5 bottom timbers, 12 feet by 12, 30 feet long, 150 feet, at 10 cents	15 00
20 cords of stone, at $6	120 00
318 pounds 1½-inch round iron for bolts, 3 feet long, at 4½ cents	14 31
Carpentry and labor	25 00
Cost of one crib	272 31
6 cribs, at $272 31	1,633 86
5,863 board measure 3-inch pine plank, at $14	82 08
163 pounds 6-inch spikes, at 7½ cents	12 22
Cost of crib work north side of cut	1,728 16

ESTIMATE—Continued.

395 square oak piles, 25 feet long, 9,875 feet, at 12 cents	$1,185 00
44.....do.....20....do.... 880.....do	105 00
790 in any lengths, not less than 30 feet, for stringers, at 12 cents	94 80
44 ties....do....12 feet long, 528 feet, at 12 cents	63 36
1,036 pounds 1½-inch round iron for bolts, at 4½ cents	466 20
Carpentry and labor	700 00
	2,314 36
Crib work	1,728 16
	4,042 52
Contingencies, 10 per cent	404 25
	4,446 77

Estimate for the repairs of the old piers at Milwaukie.

North pier 925 feet long, (500 feet 24 feet wide,) 425 feet 20 feet—	
13,875 running feet, 12 feet by 12, pine timber, in any lengths not less than 30 feet long, for side pieces and centre stringers, at 10 cents	$1,387 50
6,000.....do.....do.....in lengths of 24 feet, for ties, at 10 cents	600 00
4,200.....do.....do.....do.....20.....do.....do	420 00
6,775 pounds 1½-inch round iron for bolts, 3 feet long, at 4½ cents	304 87
30,000 feet, board measure, 3-inch pine plank, in lengths of 24 feet, $14	420 00
21,250.....do.....do.....do.....20....do	297 50
798 pounds 6-inch spikes, 7½ cents	59 85
100 cords of stone, $6	600 00
Carpentry and labor	800 00
	4,889 72
Contingencies, 10 per cent	488 97
Cost of repairs to north pier	5,378 69

MILWAUKIE.

Repairs south pier, 650 feet long—	
9,750 running feet, 12 feet by 12, pine timber, in any lengths not less than 30 feet long, for side piers and centre stringers, at 10 cents	$975 00
3,000.....do.....do.....in lengths of 20 feet, for ties, at 10 cents	300 00
3,150.....do.....do.....do.....18.....do.....do	315 00
4,664 pounds 1½-inch round iron bolts, 3 feet long, at 4½ cents	209 88
27,500 board measure, 3-inch pine plank, at $14	385 00
542 pounds 6-inch spikes, at 7½ cents	40 65
100 cords of stone, at $6	600 00
Carpentry and labor	600 00
	3,425 53
Contingencies, 10 per cent	342 55
Cost of repairs to south pier	3,768 08
Cost of repairs to north pier	5,378 69
	9,146 77

ESTIMATE—Continued.

South side of cut 150 feet in length of crib work, 10 feet high and 12 feet wide, 660 feet in length of piling—	
5 cribs, at $272 31	$1,361 55
4,269 board measure 3-inch pine plank, at $14	64 80
139 pounds 6-inch spikes, at 7½ cents	10 42
	1,436 77
660 12 feet by 12, oak piles, 25 feet long, 16,500 feet, at 12 cents	1,980 00
86.....do.....do.....20....do....1,640.....do	196 80
1,320.....do.....in any lengths not less than 30 feet, at 12 cents	158 40
86.....do.....in ties, 12 feet long, 1,032 feet, at 12 cents	123 84
2,026 pounds 1½-inch round iron for bolts, at 4½ cents	91 17
Carpentry and labor	1,350 00
	3,900 21
Crib work	1,436 77
	5,336 98
Contingencies, 10 per cent	533 69
	5,870 67

RECAPITULATION.

Cost of piers, (outside)	$49,197 55
Protection north side of cut	4,446 77
Protection south side of cut	5,870 67
	59,524 99

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, April 13, 1854.

SIR: I have the honor to submit a report of the Board of Engineers, in reference to the harbor of Chicago.

The Board recommends the use of the dredge boat upon the outer bar, and on similar service inside the pier heads or pier ends.

The entrance channel at that place, which requires this aid, is usually known as the northern channel. It is this channel and the outer bar at its entrance to which the Board has reference.

The Board also recommends attention to the repairs required for the security and preservation of the existing works. These matters have been already to some extent attended to, as the only work done on these piers since the appropriation of August, 1852, has been in making repairs. It is supposed therefore that but little under the head of repairs will be required to be expended.

The report of the Board is considered partial, or preliminary, in order to avoid any unpleasantness, at the time which the final revised report of the Board will require. The harbor and works there were inspected by a member of the Board during the last season. His illness since his return has prevented his giving a personal attendance to the meetings of the Board, which is highly desirable before the final report is made out.

But in reference to the preliminary measures now advised, all of the Board agree, and also the undersigned.

The amount of the appropriation for Chicago is	$20,000 00
Amount expended	763 46
Leaving unexpended	19,236 54

which amount will much more than meet the views of the Board.

In using the dredge, certain officers will have to be appointed, as captain and mate, a manager of the steam engine, assistants, firemen, laborers, and probably a pilot. In order to save pernicious delay, it is respectfully recommended that these matters be left to the discretion of the superintending engineer. In the present case it will be Lieutenant Colonel Graham, whose orders require him to be at Chicago by the 20th inst.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Col. Corps Top. Engs.

Hon. JEFFERSON DAVIS, *Sec. of War.*

Approved:

JEFFERSON DAVIS.

WAR DEPARTMENT, *May* 6, 1854.

BOARD OF ENGINEERS, LAKE HARBORS AND WESTERN RIVERS,
Washington, April 11, 1854.

SIR: I have the honor to report, respecting the harbor of Chicago, that the information in the possession of the Board is not such as to enable it to prepare a final plan and estimate for the work. Meanwhile, the Board has very respectfully to suggest to the bureau the expediency of employing the dredge boat at Chicago, in deepening the channel over the outer bar, and in such other service, inside of the pier heads, as it may find to be expedient and necessary for facilitating the ingress and egress of vessels. It has also to recommend to the early attention of the bureau the repairs required for the security and preservation of the existing works.

Very respectfully, I have the honor to be, sir, your obedient servant,

JAMES KEARNEY.
Lieut. Col. Top. Eng., Pres't Board.

Colonel J. J. ABERT,
Bureau Top. Eng.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, April 10, 1854.

SIR: I have the honor to submit the revised report of the Board of Engineers on Lake Harbors and Western Rivers, in reference to the improvement at Manitowoc.

The appropriation for this harbor, in the law of August, 1852, is for	$8,000 00
Of this amount there has been drawn out	1,667 87
Leaving in the treasury an amount of	6,332 13
The report of the Board hereto appended anticipates an expenditure of	26,533 94
Which would leave an amount yet to be supplied of about	20,000 00

Fully concurring with the views of the Board in this matter, the plan is respectfully submitted in conformity with regulations.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Col. corps Top. Eng.

Hon. JEFFERSON DAVIS, *Sec. of War.*

This plan is approved to be undertaken only so far as can be completed with the means at the disposal of the department, or which may be supplied by parties interested for their own benefit; no work will be undertaken that will require further appropriations by Congress to complete it or render it effective.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *April* 25, 1854.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, August 4, 1854.

SIR: I have the honor to acknowledge your direction as communicated by Mr. Chief Clerk Campbell, to report upon the following points in reference to the plan for the improvement of the harbor of Kenosha, formerly Southport, of Lake Michigan.

1st point. What part of the plan is it contemplated to execute with the unexpended balance on hand?

This question being fully answered and in much detail, by a report from the Board of the 3d instant, I have the honor to submit a copy of it.

2d point. Have any assurances been received that the remaining sum, necessary to complete the plan, will be furnished by the local authorities or citizens of the place?

I am not aware of the existence of any such assurances; there are none in this office of recent date, that is, since the passage of the appropriation of August, 1852. Before that date there were intimations of this kind, and expenditures of a serious amount were actually made by the citizens of that place.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Col. Corps Top. Eng.

Hon. JEFFERSON DAVIS, *Sec'y of War.*

The plan for improvement of the harbor with the balance of the appropriation is approved, it being understood, though not stated, that the work proposed will be complete in itself without any further expenditures.

JEFFERSON DAVIS,
Sec'y of War.

WAR DEPARTMENT, *August* 26, 1854.

BOARD OF ENGINEERS, LAKE HARBORS AND WESTERN RIVERS.
Washington, April 17, 1854.

SIR: I have to report, in relation to the plans and estimates for the improvement of the harbor of Manitowoc, Wisconsin, as follows:

The Board, in its report of November, 1853, (Sen. Doc. 1, 33d Congress. Appendix K,) being guided by the plans and estimates of Captain Webster, the superintending engineer, which it had not then time to revise, gave, as the aggregate cost of the work, the sum of $32,402 42. Since then, however, Captain Webster's plan and estimates have been carefully scrutinized, and the scrutiny has resulted in the introduction of some modifications of his plan, and in a reduction of the estimate to $26,353 94. The main difference between the two projects, namely: that of Captain Webster, and that of the Board, may be gathered from the following statement.

1. Conforming to the limits, very judiciously prescribed by the bureau, for the depth of the artificial channels of navigation on the lakes, the Board proposes to carry out the piers to 12 feet of water only, instead of 14 feet, as required by Captain Webster, thus reducing the length of the north pier to 400 feet, and of the south pier to 600 feet.

2. But the Board decides to give to those piers a width of 20 feet from the shore to their outer extremity, in conformity with the rule reaffirmed last year, respecting the width of piers. By the preliminary project of the superintending engineer, already referred to, fifteen feet was assumed as the width of each pier, on a length of 600 feet, and he proposed to add to the south pier 200 feet more of crib work, with a width of 20 feet.

3. The plan, then, which the Board has very respectfully to recommend for the improvement of Manitowoc, is to construct two parallel piers of timber and stone, 200 feet apart; the piers to be about 20 feet wide throughout, to rise 5 feet above the ordinary level of the lake in calms, and to be covered with a platform, or flooring, of 3-inch plank —the planks to be 2 inches apart; the north pier to be 400 feet long, and the south pier to be 600 feet long, and to dredge the channel.

The precise direction, or bearing of the piers, to be definitely determined on having ascertained the course of the prevailing storms at the harbor. They should make with the course of the storms an angle of some thirty degrees. For the present, the bearing assumed for the piers is S. 83° ½ E., or E. ½ S., nearly, as it is supposed, that the pre-

vailing storms proceed from the S. 52½°, or SE. ¾ E.—a direction which is probably near the truth.

Very respectfully I have the honor to be, sir, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Eng., Pres't Board.

COL. J. J. ABERT,
Chief of Bureau Topographical Engineers.

Estimate for building piers at the mouth of Manitowoc river, Wisconsin.

20 side pieces.....12 feet by 12, 31 feet long, 620 feet, at 10 cents	$62 00
10 stringers.....do.....30...do.....300.....do.....	30 00
30 ties.....do.....29...do.....600.....do.....	60 00
8 bottom timbers.....do.....30...do.....240.....do.....	24 00
35 cords of stone, at $7.....	245 00
650 pounds 1¼-inch iron, at 5½ cents.....	35 73
Carpentry and labor	40 00
One crib.....	496 75
33 cribs, at $496 75.....	16,392 75
Machinery, dredging, &c.....	5,101 72
	21,494 50
51,429 board measure 3-inch pine plank, at $14.....	720 00
857 pounds 6-inch spikes, at 7 cents.....	59 99
	22,274 49
Contingencies, 10 per cent.....	2,227 45
	24,501 94

BUREAU OF TOPOGRAPHICAL ENGINEERS.
Washington, September 5, 1854.

SIR: A letter from Lieut. Col. Graham, of the 19th ult., presenting interesting views in relation to several of the harbors of Lake Michigan, was submitted to the Board, whose revised report on these harbors is now submitted to the War Department.

1st.—Manitowoc.

The Board recommended, in the approved plan, a distance between these piers of 200 feet. Lieut. Col. Graham recommends that this distance be increased to 240 feet. Agreed to by the Board, which, however, recommends that this increased distance be obtained by removing the position of the southern pier.

2d.—Sheboygan.

Lieut. Col. Graham recommends the application of sheet piling to the outer ends of the existing piers. Course approved by the Board.

3d.—Kenosha.

Lieut. Col. Graham recommends sheet piling in this case, to which the Board agrees, provided the dredging can be done at an adequately reduced rate.

The Board does not agree with Lieut. Colonel Graham in reference to the dredging inside, within the river at Kenosha. The rule or usage to which the Board refers has always governed lake harbor operations, namely: that access could be made from the lake to a harbor, by the removal of any obstructing bar, but operations inside to enlarge, or to create a harbor, are not legitimate objects of United States expenditure, and require to be specially authorized. This rule, or usage, first received official sanction of the department when under the direction of Mr. Secretary Wilkins, at the recommendation of the bureau, upon some demands about the harbor of Buffalo, New York.

But the Board is of opinion that none of the suggestions of Lieut. Col. Graham (except the last) will, as explained in the letter of Colonel Graham, and in the report of the Board, occasion any expenditure beyond the estimate of the approved plans, and all of these suggestions (except the last) were reviewed favorably by the Board.

It is therefore respectfully recommended that the revised report of the Board be approved under those restrictions.

The following are the directions of the department in reference to these several works, namely:

Manitowoc. This plan is approved, to be undertaken only so far as can be completed with the means at the disposal of the department, or which may be supplied by parties interested for their own benefit. No work will be undertaken that will require further appropriations by Congress to complete it, or render effective.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *April* 25, 1854.

Kenosha. Colonel Abert will report what part of the plan it is contemplated to execute with the unexpended balance on hand, and whether any assurances have been received that the remaining sum necessary to complete the plan will be furnished by the local authorities or citizens of the place.

By direction of Secretary of War.

A. CAMPBELL, *C. C.*

WAR DEPARTMENT, *August* 2, 1824.

The required report having been made, the following direction was given:

The plan for improvement of the harbor with the balance of the appropriation is approved, it being understood, though not stated, that the work proposed will be complete in itself without any further expenditure.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *August* 26, 1854.

Sheboygan. The plan recommended is approved so far as the same can be carried into effect with the funds at the disposal of the department.

JEFFERSON DAVIS,
Secretary of War.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Col. Corps Topographical Engineers.

Hon. JEFFERSON DAVIS,
Secretary of War.

Approved: subject to previous limitation.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *September* 18, 1854.

OFFICE BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, May 18, 1854.

SIR: In the letter of Brevet Lieut. Col. J. D. Graham, superintending engineer, Lake Michigan, of May 10th, relative to the harbor of Manitowoc, referred to this Board, is found the following passages.

"Upon the plan furnished by the Board of Engineers, the direction for the piers is laid down and marked in writing as north 85½° east magnetic. In the text of the instructions of the Board, however, the course is stated at south 83½ east, or east ½ south nearly, shewing a discrepancy of eleven degrees in the direction between the text and the drawn plan. I have laid the work out in conformity with the drawing, that is to say, upon a course of north 85½° east *magnetic*, and beg to be informed if this is correct. If any change is required it can easily be made before the materials can be delivered for beginning the work."

In reply to this, I am instructed to state that a clerical error has crept into the text of the report quoted by Lieut. Col. Graham. In writing out the instructions in reference to the direction proper for the piers, it was the desire of the Board, as it was without precise information of the course of the prevailing storms at Manitowoc, to express itself in general terms only, that it should be determined principally by the course of these storms, with which they should make an angle of some 30°, and that it was of the opinion, as these storms are believed to proceed from the southeast point, the bearing assumed for the piers should be north 85° 30′, or east ½ north nearly. If, however, the superintending engineer shall ascertain that, in fact, the prevailing storms proceed from a point different from that provisionally assumed by the Board, he should be instructed to make a corresponding change in the direction.

The Board desires, before closing, to call the attention of the bureau to two other points in the letter of Lieut. Col. Graham, namely, the

proposition to use, as gathered from the advertisement for bids to furnish materials inclosed, pine timber in the work above as well as below the level of the water, and to apply the whole number of cribs to forming the south pier. The Board is of opinion that pine timber may be employed with advantage below the surface of the water, but that above that plane the material should be hard wood. In regard to the latter point the Board would prefer, at the same time, that it acknowledges the paramount necessity for pushing out the south pier as far as possible, that some portion of the crib-work executed with the present means be applied, under the direction of the superintending engineer, in forming the north pier, and thus reap in some measure the advantage due to the flow of the water from the river.

The letter of Lieut. Col. Graham is returned.

I have the honor to be, sir, very respectfully, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Eng's., Pres't Board.

Col. J. J. ABERT,
Bureau Topographical Engineers.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, April 21, 1854.

SIR: I have the honor to submit the report of the Board of Engineers on Lake Harbors and Western Rivers, in reference to the harbor of Sheboygan.

The views of Captain Webster, which are approved by the Board involve an expenditure (in addition to present means) of about	$22,000
The amount of United States appropriation for 1852 was	10,000
Of which there is now available	9,195

The original survey, plan, and estimate for the work was by J. M. Berrien, esq.,* in 1838. The total estimate was for $84,900.

The expenditure of $30,000 to which the Board refers is from local sources.

The Board recommends an accurate survey, to exhibit present condition of localities. This could be attended to by Lieut. Col. Graham, if allowed to use Gamble, agent at Waukegan, as assistant; Gamble in the meantime to draw his pay from the Waukegan fund. The survey would then cost about $1,000, but if Gamble were paid out of the Sheboygan fund it would then cost (to that fund) about $1,500.

Gamble is very competent to do the work under the direction of Lieut. Col. Graham.

This idea of a survey also involves the consideration, that the present report of the Board (about Sheboygan) is a preliminary report in

* Berrien had been a lieutenant of artillery on topographical duty, but was then a civil engineer in the employ of the State of Michigan.

in reference to that harbor, liable to revision when the proposed survey is made.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Col. Corps Topographical Engineers.

Hon. JEFFERSON DAVIS,
Secretary of War.

The plan recommended is approved so far as the same can be carried into effect with the funds at the disposal of the department.

If the agent for another work be temporarily employed on this work he must, while so employed, be paid from the appropriation for it. The department has no authority to accept the cession of jurisdiction over the piers erected by the town or other corporate authorities.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *June* 23, 1854.

OFFICE OF BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, April 17, 1854.

SIR: The subject of the improvement of the harbor of Sheboygan having been laid by the bureau before the Board, I am instructed by the Board to make the following report thereon.

The present harbor was constructed under authority of the State of Wisconsin, by the harbor commissioners of the town and county of Sheboygan, and consists of two parallel piers of 1,000 feet, 175 feet apart. These piers are formed of pile-docking for 400 feet, to the line of the lake shore, and thence by crib work for 600 feet to 10½ feet water into the lake, at the present stage. The cost of these works, including dredging to 12 feel water, it is understood, has been $30,000.

In the memoranda that accompany the annual estimate from this office, dated November last, the considerations which influenced the Board in recommending the sum of $11,000 for the fiscal year ending the 30th of June, 1855, for this work are in these words:

"The superintending engineer, Captain J. D. Webster, Topographical Engineers, in his annual report of September 1, says of this harbor: 'The work cannot be considered complete without the addition of 700 feet to the piers put down by the county and town authorities.'

"The cost of this extension he estimates at	$26,936 00
"He also provides for strengthening the present crisis	3,064 00
"Amount	30,000 00
"From which he deducts (supposed) available of late appropriation	8,000 00
"Leaving to be provided	22,000 00

which, for some, at least, of the considerations which have governed

in other cases, the Board recommends may be divided into two seasons, by an appropriation of the amount asked for in the margin, namely, $11,000.

The superintending engineer states in the same report that "this extension would be an average depth of 15 feet;" and although this depth exceeds the depth, to wit, 12 feet, deemed by the Board the least to which all similar works on the lakes, to be efficient, should extend, yet, in view of the discrepancies that exist between the report and maps before the Board, it did not hesitate to adopt the recommendation in question, believing the extension named would fall short of the length ultimately required. These discrepancies, which it was found impossible to reconcile, are as follows:

The agent says: "The further extension of the piers 240 feet will extend the works into 12 feet water," whereas, taking his own map as authority, it will require 1,012 feet to reach that depth; and, taking that of Lieutenants Center and Rose of 1836, but 175 feet. Again, the superintending engineer gives 700 feet for the extension of the piers, or 350 feet for each, bringing them into 15 feet, whereas the map first mentioned indicates that it would require 1,125 feet, and the second map 375 feet, to reach that depth.

The position and direction of the present piers nearly conform with those drawn on the survey of Lieutenants Center and Rose, dated in 1836. The only important difference is, that the latter calls for a channel way between the piers into the river of 200 feet, whereas the former is only 175 feet wide. The plans, with this single exception, indeed, are identical. Any extension of the present piers may, therefore, be regarded as an extension of the original design, considered as unfinished, and that whenever they reach the proper depth the design is completed. In reference to such an extension, the superintending engineer holds the following language: "I see no way of carrying on the work except, as intimated, of adding to the piers already existing. But I submit that it will be proper for the county and town authorities to cede all their rights and jurisdiction over the present work to the United States." In this opinion the Board fully concurs. It is also of opinion that this extension should, as suggested by Captain Webster, be 20 feet wide, the cribs having open bottoms, instead of close ones, as called for by the contract under which the present works were constructed; and that the jog in the alignment of the piers caused by this increased width be on the outside, leaving the interior lines flush. The Board would remark, that the jog on the outside may be avoided, indeed, by putting the desired increased width, five by an oblique line, all in the first crib. It is likewise recommended that the entire work have a uniform height above the level of the lake by raising the 400 feet of each pier at the shore end, where, from the lesser depths, the surf necessarily rises highest.

In reference to the relative lengths of the two piers, the superintending engineer says: "I think we are not yet in possession of data on which to decide how to apportion the additional 700 feet between the two piers. It does not seem quite certain which of the two can be said to be the windward pier, or from which direction the main drift is to be expected. If there be any difference, it will now soon appear,

although it is certainly less marked than at most of the other ports on the lakes. However this may turn out, not less than the amount indicated of pier work will be necessary." The uncertainty on this point is confirmed by the notes of a member of the Board in the examination of this harbor, which state that "the drift appears equal about north and south." On the other hand, the map furnished by the agent indicates, by the accumulation filling up the mouth of the original river north of the piers, and the corresponding dispersion of sand south of them, that the drift is from the north. Nevertheless the board thinks the question of relative length of the piers should be left open as dependent on the effects of the present piers through a longer period of time. This experience will probably prove that the drift is from the north, and that as a consequence the north pier should be the longer of the two.

It will be seen from the foregoing remarks that the Board approved of the course of operations recommended by the superintending engineer, Captain Webster. The cost of carrying them out received also the sanction of the Board in its last annual estimates, and was only divided into two sums from the impression that no larger amount would likely be obtained. As economical and engineering questions, however, the Board does not hesitate to express the opinion that the entire amount should be available at one time.

The Board, in conclusion would respectfully recommend, in consideration of the discrepancies in the present maps, and between them and the reports to the bureau, already referred to, that a survey be made of the locality and surrounding waters, out to the three fathom line of the lake.

The following papers are herewith returned. The annual report of Mr. D. Newland, agent, dated September 1, 1853. A sketch of his survey of the harbor, and a tracing of the mouth of Sheboygan river, from the survey of Lieutenants Center and Rose, dated in 1836.

I have the honor to be, sir, very respectfully, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Engs., Pres. Board

Col. J. J. ABERT,
Bureau Topographical Engineers.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, May 1, 1854.

SIR: I have the honor to submit, in conformity with regulations, the revised plan of the Board of Engineers on Lake Harbors and Western Rivers, in the reference to the harbor of Racine on Lake Michigan.

The amount of the plan of the Board is.....	$18,956 30
The value of materials on hand and of available funds..	7,251 78
Leaving a balance yet to be provided of	11,704 52

This amount is the estimate of the Board to complete work at that harbor, in conformity with existing plans.

Respectfully recommended to be approved.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Col. Corps of Topographical Engineers.

Hon. JEFFERSON DAVIS,
Secretary of War.

The plan is approved. The work to be commenced, however, must be only such as can be completed with the means at the disposal of the department, or supplied by parties interested for their own benefit. No work is to be undertaken that cannot be completed, or that will require further appropriations to render it effective.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *May* 26, 1854.

OFFICE BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, April 20, 1854.

SIR: I am instructed by the Board to make the following report on the harbor of Racine, Wisconsin, elicited by the letter of the mayor of the city, of the 6th ult., to the bureau, and laid by it before the Board.

In the report of the 25th June last, on the letter of Mr. J. A. Carsewell, agent of this harbor, dated the 30th of the previous month, the board expresses the opinion that the repair of the piers ought to be undertaken at once, and that for the reasons given by the agent pine timber might be used with advantage for all work under water, reserving for future decision the question of the prolongation of the piers until the Board should be in possession of additional information deemed necessary to elucidate the subject.

The prolongations proposed were to extend the south pier 150 feet on the present line, and the north pier 96 feet in original direction, or parallel to the first.

The subject of this harbor again came under the notice of the Board on preparing the estimates for the fiscal year ending the 30th of June, 1855. The annual report of the superintending engineer then before it, states that "the agent in charge of this work recommends adding 224 feet to the north, and 352 feet to the south pier, and to change the direction of the north pier in a curve towards the south. Of this change I approve, both for the reasons given by the agent, and also for others which have been briefly stated in the remarks on Chicago. The estimated amount required to complete the work is $17,454 94, which is certainly very moderate, and ought rather to be increased than diminished.

This sum the Board understood, from the phraseology, to be the entire sum necessary to execute the work, and accordingly adopted it after

deducting the balance yet deemed available from the current appropriation for the estimate. It would seem, however, from the report itself of the agent, now before the Board, that this amount was in addition to the "balance of appropriation and value of materials remaining after repairing present piers and paying indebtedness," a sum the Board, as the question of the extension of this pier had not been decided upon, would have hesitated to recommend. With this explanation the Board will now submit its views in regard to the future operations.

Two conditions, as a general rule, have been adopted by the Board for piers projected from the mouth of rivers into the lakes: First, that they shall extend to twelve feet water at least; that the depth being necessary to accommodate the trade; and second, that they shall be on lines parallel to each other to secure the full effect of any *scower* from the waters of the river above. The relative lengths of the piers is a third point, and depend, in the opinion of the Board, upon the peculiarities of each locality, as the direction of the drift, the course of the most violent storms, &c. A plan, so far as the first two conditions are concerned, is thus one of easy application to any locality. In regard to the third, beyond the mere point that the windward pier should be the one of the greater length, the question can only be settled approximately, leaving the precise relative proportion dependant upon the effects produced during the progress of the operations. In the case of the harbor of Racine, the question of the proper proportioned lengths of the piers is further complicated; as, from the report of the agent, it would seem that the waves reflected from the inner line of the south pier renders the anchorage in the river above uneasy, notwithstanding the north pier, considered as the windward pier, extends out beyond, or overlaps it 180 feet.

In this fact the Board finds another reason for not defining precisely the relative lengths of the piers.

The direction given in the first instance to the pier was due east, or about a point and a half south, of a line perpendicular to the shore, which at this part of the lake trends about N. 17° W. (Center & Rose, 1836.) The entire south pier, 530 feet in length, has been constructed on this course. Of the north pier, 240 feet have the same direction. It then flares towards the north on a course N. 82° 30′ E. for 145 feet, and again N. 77° E. for 245 feet, its present termination. (Carsewell, October, 1853.) By this arrangement the channel which at first is but 160 feet wide, increases at the head of the south pier to 195 feet. (Carsewell, October, 1853.) The question now arises, in complying with the conditions already laid down, namely, of extending the works to twelve feet water, and making them parallel, whether they shall be carried out on the original line, that is, a due east line, or the line of the outer portion of the north pier, or about N. 77° E., were the questions dependant alone upon the movement of the drift, the Board would have no hesitation in adopting the latter; as in that case the northeast winds, considered as the violent winds, would strike the pier at a smaller angle than the same winds strike the shore—a condition, in the opinion of the Board, necessary to give the proper direction to the drift, which would otherwise pass close round the head of the north pier and be deposited in the mouth of the harbor.

But the exposure of the entrance between the piers to the direction of the most violent winds should also be considered. This exposure becoming greater as the line of the piers inclines towards the north, were the line favorable as regards drift adopted, the inconvenience now complained of in the uneasy character of the anchorage in the river, over and above the inconvenience which would be felt from the same cause by the adoption of the line of south pier, or the original direction, would in so much be continued. The difference in this respect on the extension of the north pier into twelve feet water, whether the first or second direction be taken, would be equal only to the substance of the angle the two lines form with each other, or about forty feet; a length of protection the effect of which would not be sensibly felt in lessening the roll of the sea into the river. Under this view of the subject the Board respectfully, recommends in the further extension of the works, the adoption of the line of the outer portion of the north pier. The Board would likewise recommend that the extent of the south pier be limited for the present by a NNE. line drawn from the head of the north pier, founded in twelve feet water. These conditions give an increased length of one hundred and seventy-five feet to the north pier, and two hundred and sixty-five feet to the south pier; the former standing out in the lake one hundred and forty feet beyond the latter; whereas the present difference is two hundred and thirty feet—a difference less favorable, it is thought, to secure the full benefit of the flow of the waters from the river above.

The construction of the piers for four hundred and forty feet, as above, with the necessary machinery and dredging, will cost $18,663 70. (See detailed estimate annexed.) Taking the cost of machinery from this amount, and also from the balance now available in money and materials, as common to either measure, the means at disposal will construct one hundred and sixty-five feet of the pier-work, and do a proportional amount of the dredging. This length is equal to the length of five and a half cribs. Of this number the Board recommends that three cribs, or ninety feet, be added to the south pier, and two cribs, or sixty feet, to the north pier; leaving the half crib length, or fifteen feet, to be divided among the whole, if the timber on hand shall admit of it.

A tracing of the map of the harbor by Mr. Carsewell, the agent, showing the extension of the piers, as suggested by him and approved by the superintending engineer, and the extension as recommended by the Board, with the portion of each that may be accomplished with the present available means, is herewith submitted in illustration of the foregoing report.

The letter of the mayor of Racine is returned.

I have the honor to be, very respectfully, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Eng., Pres't Board.

Col. J. J. ABERT,
Bureau of Topographical Engineers.

RACINE HARBOR, WISCONSIN.

Estimate for extending the north pier 175 feet, and the south pier 265 feet, in all 440 feet, to 12 feet water.

PIERS TWENTY FEET WIDE.	
Estimate for 1 crib, 30 feet long, complete—	
31 side-pieces, 12 by 12, 31 feet long, 992 feet, at 14 cents	$138 88
16 stringers, 12 by 12, 30 feet long, 480 feet, at 14 cents	67 20
46 ties, 12 by 12, 20 feet long, 920 feet, at 7 cents	64 40
8 bottom timbers, 30 feet long, 240 feet, at 14 cents	33 60
60 cords of stone, at $6	360 00
900 pounds 1½-inch iron, at 6 cents	54 00
Carpentry and labor	60 00
1,583 feet, board measure, pine plank, at $12 per M.	19 00
27 pounds 7-inch spikes, at 7¼ cents	2 02
	799 10
14⅔ cribs, say at $800	11,733 00
1 crane, scow and apparatus for same	300 00
Tools and implements	100 00
Hire of scows	100 00
Dredging 22,500 yards, at 16 cents	3,600 00
Compensation of agent, one year, at $120 per month	1,400 00
Amount	17,233 00
Contingencies, 10 per cent	1,723 00
Total amount	18,956 30
Estimated amount of balance of present appropriation, and value of materials remaining, after repairing present piers, and paying indebtedness	7,251 78
Amount required to complete the harbor as now proposed	11,704 52

JAMES KEARNEY,
Lieut. Col. Top. Eng.. Pres't Board.

OFFICE BOARD OF ENGINEERS, LAKE HARBORS AND WESTERN RIVERS,
Washington, April 20, 1854.

BUREAU OF TOPOGRAPHICAL ENGINEERS.
Washington, May 16, 1854.

SIR: I have the honor to submit the report of the Board in reference to Clinton Harbor on Lake St. Clair.

The first appropriation (1852) was $5,000 of which $300 have been drawn out for making the desired survey and investigations, leaving undrawn in the treasury $4,700.

And, from the report, the additional sum of $5,500 will be required to complete the improvement according to the plan now submitted.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Colonel Corps Topographical Engineers.

Honorable JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *June* 22, 1854.

So much of the plan is approved as can be executed with advantage, with the appropriation or other funds available for the work.

JEFFERSON DAVIS,
Secretary of War.

OFFICE BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, May 5, 1854.

SIR: The bureau having called the attention of the Board to the plan and estimate for the improvement of Clinton river, Michigan, submitted by Captain Canfield, Topographical Corps Engineers, superintending engineer, under date of the 22d of September last, I am instructed to present the following report thereon.

The plan of Captain Canfield contemplates the dredging of a channel 100 feet wide, for a depth of nine feet from the river through the obstructed portion of the channel as at present, to the same depth in the lake, between two parallel lines of close piling, 150 feet apart, for so much of the distance as require excavating for three feet. This distance he sets down at 1,200 feet, making the length of the piling 2,400 feet. The estimate for carrying out this plan is as follows:

For a close piling for the sides of the cut, where the dredging is three feet deep, 2,400 piles, 12 feet long, at 75 cents each	$1,800 00
Driving 2,400 piles, at 20 cents each	480 00
Dredging 21,958 cubic yards, at 12 cents per yard	2,634 96
Cost of horse pile driver	900 00
	5,814 96
Add for contingencies, 5 per cent	290 74
	6,105 70
Present appropriation	5,000 00
Required	11,105 70

The plan, as described above, the Board approves, with the single exception of limiting, as proposed, the close-piling, which it is of opinion should extend throughout the entire length of the cut, 2,400 feet, laid down on the survey as the distance from nine feet in the river to nine feet in the lake. This change, it will be remembered, was recommended in the considerations which influenced the Board in naming the sum required for this river in the coming fiscal year, and in so much increased the estimate over that furnished by Captain Canfield. The Board, at the same time, considered it advisable further to augment the amount by the compensation of a local agent for the immediate charge of the operations, not before provided for, by the increase of the per centage for contingencies from 5 to 10 per cent., as usual, and finally

by considering but $4,700 as on hand from last appropriation, $300 having been consumed by the survey. Under these changes the estimate will be as follows:

4,800 piles, 15 feet long, at 75 cents each	$3,600 00
Driving 4,800 piles, at 20 cents each	960 00
Dredging 21,958 cubic yards, at 12 cents per yard	2,634 96
Cost of horse pile engine	900 00
Compensation of agent one year	1,460 00
	9,554 96
Contingencies, 10 per cent	955 49
Total amount	10,510 45
Balance of present appropriation	4,700 00
Amount required	5,810 45

which, agreeably to the rule adopted by the Board to take the nearest, $500, was increased in the list of the annual estimates to $6,000.

A tracing of the original survey of the mouth of Clinton river, illustrative of this report will be found herewith.

I have the honor to be, sir, very respectfully, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Engs. Pres't Board.

Col. J. J. ABERT,
Bureau Topographical Engineers.

BUREAU OF TOPOGRAPHICAL ENGINEERS.
Washington, May 22, 1854.

SIR: I have the honor to submit the report of the Board, in reference to the harbor of St. Joseph's, of Lake Michigan.

The appropriation for this harbor, in the law of August, 1852, was	$10,000 00
Of this, there was drawn out	8,709 00
Leaving a balance undrawn of	1,291 00
Refunded by Captain Webster	347 88
Leaving in the treasury	1,638 88
The view and plan of the Board contemplate an additional expenditure of	36,523 52
From which it will be perceived that existing funds will fall short	34,884 64

unless an additional appropriation should be made, for which there is an estimate before Congress for about $18,000. The unexpended

balance of $1,638 88 would do so little to the work that it had, I think, better be preserved for pay to some one to take care of the property and for occasional repairs.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Colonel Corps Topographical Engineers.

Hon. JEFFERSON DAVIS,
Secretary of War.

Where small balances, as in this case, remain unexpended, the fund had better be turned over to the officer in charge of the district, for repairs, and the property be stored or otherwise disposed of as to relieve the government of the expense of a custodian.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *June* 21, 1854.

OFFICE OF BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS.
Washington, May 5, 1854.

SIR: The subject of the improvement of the harbor of St. Joseph, Michigan, having been laid by the bureau before the Board for consideration, I am directed to report thereon as follows:

A full report of this harbor was made by the local agent of the United States, Mr. John R. Bowes, on the 29th November, 1852. It describes the natural features of the mouth of St. Joseph river; the plan, progress, and the then condition of the works forming this improvement, and recommends the repair of the injuries sustained by them and the extension of the south pier. With the reasonings and recommendations generally of the agent, as detailed in his report, the Board fully concurs. A copy of this report, and the accompanying diagram, exhibiting the state of the works, is appended hereto.

It now only remains for the Board, in conclusion, to reiterate its views in regard to this harbor, as embodied in so much of its proceedings in making estimates for the fiscal year, ending June 30, 1855.

"For continuing the improvement of the harbor of St. Joseph, Michigan, $18,000."

"In the annual report on this harbor, dated September 19th, of the present year, (1853,) the agent says: 'The operations of this improvement for the present season have been directed exclusively to repairing its two piers—the completion of which will nearly, if not entirely, exhaust the present appropriation.' This appropriation is $10,000."

"Again he says: 'After these repairs are finished, to perfect the improvements of this harbor, a further extension of the south pier will be required,' and he recommends six hundred feet as a maximum length; still leaving the north pier standing further out in the lake by 275 feet, which, as the windward pier or the one against which the drift at this point accumulates, should have the greater length. In the above views of the agent the Board concurs. His estimate for the extension is

$36,523 52; but as it would call for the construction, putting in position and finishing off of twenty cribs, of thirty feet, in a single season, the Board deems it advisable, particularly in view of the size of the estimate, to confine the operations, at the present, to lengthening the pier for half that distance—namely, 300 feet—which, assuming the same rate per lineal measurement again in the estimate, would require an appropriation of $18,262, or say, as in the margin, $18,000."

I have the honor to be, sir, very respectfully, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Engs., Pres't Board.

Col. J. J. ABERT,
Bureau of Topographical Engineers.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, June 7, 1854.

SIR: I have the honor to submit a report of the Board of Engineers on Lake Harbors and Western Rivers, in reference to the harbor of Sandusky, and fully agree with the Board in its report—namely, that attention should, for the present, be exclusively bestowed in the repair of the breach, as indicated in that report.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Colonel Corps Topographical Engineers.

Hon. JEFFERSON DAVIS,
Secretary of War.

Approved:

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *June* 20, 1854.

OFFICE OF BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, May 15, 1854.

SIR: The Board, by instructions from the bureau, having had under consideration the letter of Mr. Patterson, agent of the United States, for the harbor of Sandusky, enclosing a memorial from the business men of that city, dated March 20, 1854, asking that the balance of the moneys now in hand, after closing the breaches in Peninsula Point, (except the wide or main cut,) may be expended in deepening the channel. I am directed in relation thereto to make the following report:

On referring to the record of the proceedings of the Board of April 11, 1853, the following entry is made, viz: "According to information recently furnished by the local agent at Sandusky, it appears that the breaches in the peninsula have lately increased in depth and width, and that the degradation of the neck is proceeding very rapidly; and,

moreover, that it will require the whole of the appropriation to secure all that part of the peninsula that lies east of the principal breach. The Board is of opinion that the filling up of the four smaller breaches, and the protection of the neck, requires prompt attention, and that this work should be undertaken and completed in preference to any other at this time."

The annual report for the season of 1853, of the superintending engineer, Captain Stansbury, in whose district Sandusky lies, contains the following in reference to this harbor.

"From the report of the local agent for this work, which has been transmitted to the bureau, it appears that for the protection of Peninsula Point, a pier, consisting of rough crib work filled with stone, for closing the four small breaches referred to in the recommendation of the Board, has been constructed on the point, two thousand six hundred and fifty-seven (2,657) feet in length, to serve as a breakwater against the action of the lake, which was rapidly wearing it away, and threatened to destroy it altogether. The construction of this work has been attended with the happiest results. The sand has rapidly accumulated on both sides of the pier, and from present appearances, the experiment promises to realize our expectations to their fullest extent. The test of winter, however, has yet to be undergone, before the work can be pronounced to be entirely safe."

There has been expended upon the work, out of the appropriation of $15,000 of August, 1852, the sum of $11,867, and there remained on hand, at the close of the 1st quarter of 1854, a balance of $3,133, and it is to the application of this balance the present report has reference. The business men of Sandusky state that the citizens have expended, in dredging, about $30,000, and have thereby very much improved the navigation, which is known to have been very crooked; in some places narrow, and in others to have quite a limited depth of water. They state also that the fund set apart for that purpose is nearly exhausted, while the condition of the channel is not entirely such as it should be to accommodate the commerce of the port. They further remark, that they deem it only just that the balance of the appropriation that now remains, after repairing the breaches on Peninsula Point, except the wide or main cut, which still remains open, should be expended in perfecting the work hitherto done by an onerous tax upon the property of the city; and they offer the use of their dredger, &c., to the government, if it should, as they request, determine to assist with the balance of the appropriation in straightening, widening, and deepening the channel.

The local agent, in a letter forwarding the application of the business men of the city, recommends a compliance with their request, and says, "that of the sum on hand no other use could be made with the money which would be so much benefit as a full concurrence in the recommendation of the annexed letter." These letters having passed through the hands of Captain Stansbury, he takes occasion to say that he concurs "in the opinion that it would be useless with the means at command to make any attempt to fill the cut between Peninsula Point and the main shore, as it is entirely inadequate," that cut or breach being about 3,000 feet long.

With this opinion of Captain Stansbury the Board agrees; but it is of opinion that claims upon the present balance of the appropriation even more pressing than the improvement of the channel, may arise, and of these, one may be found in the paramount necessity of giving to Peninsula Point all the protection the present means of the bureau may warrant.

Since the date of the letters from the local agent and the business men of Sandusky, the Board is informed through a report from Captain Stansbury, of April 26, that "on the 13th of that month a gale sprung up on the lake which continued four days. It was almost unexampled in duration and severity," and of the injuries in detail resulting to the various works under his superintendence. He states also that he has received a report from the agent at Sandusky harbor, in which, speaking of Peninsula Point and the work which had been so successfully executed last year at the four small breaches, for the filling in and defence of which that work was designed, he says: "I have this day made an examination of the work under my charge at this place, and find that by the late unprecedented gale from the northeast little damage was done to the work. Two places on the east end of the crib have settled down to nearly the surface of the water, and will require to be repaired. In view of the fact that the entire length of the work was submerged for more than forty-eight hours, and that it stood the shock of the sea, having the whole length of the lake to accumulate in, with a gale of wind, said to be the heaviest ever known here, I am inclined to think we may regard the crib work on Peninsula Point as no longer an experiment, but reality, and calculated to answer fully the purposes for which it was built."

"At the west end of the crib work, as finished by me last fall, the water has broken through the point, making a clear breach about fifteen rods wide. This breach I deem it absolutely necessary should be stopped, and therefore I recommend that the repairs to the present crib work should be done, and the same extended down the point a sufficient distance to stop the new breach made by the late gale."

In reply to this letter, Captain Stansbury says: "I have directed Mr. Patterson to commence the repairs at once, and also to take measures to close the breach made by the late storm. I shall visit the work in the course of this week, and report its situation to the bureau. The damage to the work will require all the funds on hand for its repair, and will, of course, supercede the necessity of any action upon the request of Mr. Patterson for leave to apply them to the dredging out of the channel."

This statement of the existing condition of things at Sandusky is conclusive as to the course that should be pursued. The Board agrees with the general superintendent, that the repair of the peninsula at the new breach should at once be undertaken, and carried forward to completion, or to the extent of the means at the disposal of the bureau, and that under these circumstances further action on the request of the local agent and the business men of Sandusky, for leave to apply the funds to the dredging out of the channel, is superceded.

The letter of Captain Stansbury of March 29, transmitting one from Mr. Patterson, U. S. Agent, of the 24th, covering a request from

citizens of Sandusky for the application of the balance of funds on account of the harbor, to dredging the channel at the entrance; and also the communicatian of Captain Stansbury, of the 26th ult., in which reference is made to the same subject, are herewith returned.

I have the honor to be, very respectfully, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Eng., Pres't Board.

Col. J. J. ABERT,
Bureau Topographical Engineers.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, July 17, 1854.

SIR: I have the honor to submit the report of the Board received this day, for the harbor of Cleveland, and respectfully recommend that the same be approved, the unexpended balance of the appropriation for that harbor being adequate to meet the views of the Board.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Colonel Corps Topographical Engineers.

Hon. JEFFERSON DAVIS,
Secretary of War.

Approved: JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *July* 28, 1854.

OFFICE BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, May 19, 1854.

SIR: The application of the city authorities of Cleveland, Ohio, "for permission to repair a portion of the eastern pier, lying south of the southern end of the parapet wall," communicated to the bureau by Captain Stansbury, superintending engineer of that harbor, under date of the 13th instant, having been referred to the Board, I am instructed to make the following report in reply:

Captain Stansbury, in his report, states, that "the part of the wall referred to is in a most ruinous and wretched condition. The foundation has sunk, and the coping in many places now lies at an angle of from fifteen to twenty-five degrees, inclining toward the water. The inner course of stone blocks, although clamped and dowelled, has almost entirely disappeared—having been broken, torn off, and precipitated into the river. Unless something is done at once, I would not be surprised if the whole wall should tumble bodily into the harbor, and that before the end of the season.

"I confess I was no little surprised at the rapid dilapidation of this apparently solid masonry, until I accidentally learned from a man who had charge of the stone work under Mr. Stockton, the agent at the

time, the reason of the sinking of the inner face of the wall. He informed me, that when laying the lower course under the water, the blocks were lowered from cranes, by means of a lewis, until they reached the desired level; and that, whilst thus suspended, small stones were crammed in between the blocks and the old work underneath, until the interstice was sufficiently filled to afford a bed for the block. These small stones were not at all enclosed or protected in any way. The consequence was obvious. The small stones became loosened and fell out into the water, and the lower course being no longer supported, sunk under the superincumbent weight, with, of course, an outward inclination. The whole of this part of the structure is in ruins and will have to be taken up and rebuilt.

"The board of improvement, under the city council, wish to replace it with a dock of timber, appropriating the value of the stone blocks taken out toward defraying a part of the expense. This I do not think should be permitted. The whole of the east pier is now built of cut stone—and when in a state of repair, presents a face creditable to the government.

"The great mistake was in the selection of a quantity of stone entirely too soft and friable for the purpose. Above water the workmanship is excellent; and I think that the whole work should not be allowed to be marred by the substitution of wood in any part of it.

"The city is very desirous that the government should make the repairs. But this, under present circumstances, is by no means advisable or even practicable. The west pier imperiously demands every dollar of the appropriation, and contracts or engagements have been made which will consume it all. The repairs of the dilapidated portion of the east pier are not at all essential to the integrity of the harbor, whilst the reconstruction of the west pier is vital to its existence."

After some remarks on the proposition of the city authorities to extend, without interfering with the rights of the United States, the general laws governing streets over the pier in question, which, in his opinion, would have a salutary effect in protecting the public interests, the report closes as follows: "The question now is, will the government permit the city to make the repairs referred to: and if so, will it require the work to be of stone, or will it allow wood to be used. To these questions I have promised a reply, and respectfully ask the instructions of the bureau."

The Board is of opinion, that in view of the limited means available for the harbor of Cleveland, it is desirable the city authorities should undertake the repairs of the east pier, referred to in the foregoing extracts from the letter of Captain Stansbury, and that their application to effect the object be acceded to by the United States, it conceives, however, that the public interests require that the proposition be accepted only on the following conditions:

1. That the repairs be required to conform to the original plan of the pier. 2. That they be made by taking out the old work down to low water, where the injuries have this extent, and replacing the stones on a bed of biton or concrete laid below that level; the old materials being used as far as they will go, if needs be, by redressing, and any new material to make up the waste, of stone of a hard character applied to the

upper courses, at least to the coping course. 3. That the control and supervision of the repairs be in the superintending engineer of the government; and lastly, 4. With the understanding that the consent recommended as above, if granted, shall not be construed as lessening, in any degree, the right of the government of the United States in the pier, or be made the ground hereafter of any claim for reimbursement of expenses in repairing the same.

The letter of Captain Stansbury is returned.

I have the honor to be, sir, very respectfully, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Engs., Pres't Board.

Colonel J. J. ABERT,
Bureau Topographical Engineers.

OFFICE BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, May 27, 1854.

SIR: In answer to the call of the bureau for a plan for continuing the improvement of the harbor at Cleveland, Ohio, under the present appropriation, I am authorized to make the following report:

The Board is of opinion that the means avaliable for this harbor should be applied to the west pier, at present in a most ruinous condition, only portions of it appearing above the water. The entire length of the pier, from the present line of the lake shore, is 750 feet, which may be thus described: Commencing at the shore, which seems not to have changed at this point since the year 1839, the first 130 feet in rip-rapping, 13 to 30 feet wide, followed by an opening of 55 feet, then rip-rapping again for 210 feet, (26 to 47 feet wide,) and lastly, three rows of piles at unequal distances apart. Within the line of piles the water varies in depth from 1.7 feet inside to 7.9 feet near the outer extremity of the pier—these measurements being taken from Captain Stansbury's survey of 1853.

The character of the bottom under these soundings is not shown upon the map. We know, however, that it must be chiefly, if not altogether, of the loose stone originally employed in the work; but whether of loose stone or of the usual lake deposites, the plan which the board has to propose for the renewal and repair of the pier will not be thereby materially affected, although the presence of the stone would be desirable.

The pier, according to the original plan, was composed of vertical crib-work, about twelve feet in width. Subsequently, loose stone was deposited along the outer or lake side of the pier, forming an inclined plane, and the piles above mentioned driven. These latter measures being taken to secure the work against the destructive action of the waves.

The Board need not, at this late day, declare the opinion that this course of proceeding, so popular in the early history of the lake harbors, and so specious, was the very one, of all others, most likely to bring about the result it was designed to avert. An inclined profile for

the face of a work exposed to the batter of heavy *seas*, when a vertical face can be easily formed, meets at present with few advocates among hydraulic engineers. For the lakes, where, owing to the durability of wood under water, and the cheapness of the material, such a profile may be readily formed—it is now alone employed. This practice of rip-rapping was most emphatically condemned by the bureau in the annual report of 1839, soon after taken charge of the harbor improvements, and it was thenceforth abandoned.

The Board, then, cannot recommend the renewal of the portion of the work under consideration. The question then arises, whether the exterior slope or talus of loose stone shall be removed altogether and the crib work renewed upon the original line of pier, or whether the cribs shall occupy a line on the natural bottom of the lake, at the foot of the inclined plane. The board is of opinion that the latter course should be adopted.

This new line of cribs would have the advantage of presenting a vertical front to the sea and of annulling its force more effectually than the old rip-rapping, while owing to its position with respect to the exterior line of piles of the old work and to the loose stone, &c., inside of them, it would derive much support from the latter. As a question of construction, the proposed line of cribs offers fewer difficulties than the old line, for upon the original line it would be necessary to conform and secure the cribs to the old work, an operation the Board conceives can in no case be properly carried out. It is also of opinion, that on the score of economy, the proposed plan is entitled to the preference. With respect to the width of the cribs for the proposed line of pier, the Board, in consideration of the support the crib work would derive from the remains of the old work, recommends the use of cribs of twelve feet wide only—except at the outer end, where they should be twenty feet, and the new pier head should be made to conform to the figure which it now presents by the heads of the piles. No extension seaward, beyond the covering of crib work, should be given to the pier—the Board being of opinion, that as the requisite depth between the piers and the permanency of the shore has been maintained for many years, a further extension is not at present called for. The original purpose of the works for the improvement of the harbor of Cleveland has been attained—namely, the maintenance, at all seasons of the year, of a sufficient depth of water for the largest class of lake vessels; and this at a locality, where formerly, it is said, there was to be sometimes found little else than a dry sand bar, and this result would seem to be permanent, or it may at least be reasonably reckoned upon as long as the works are maintained in a sound condition, the desired depth of channel and the shore line having already maintained a condition of permanency for at least fifteen years.

The line of the twelve feet cribs, if occupying the entire distance from the outer end of the pier to the present shore, would be about 750 feet in length—and of the twenty feet cribs, about sixty feet of the latter cribs there would probably be two, and they would have irregular figures in the plan. The length given to the twelve feet crib-work is the maximum length, which the local engineer should have authority, at his discretion, to reduce at any point short of reaching the shore.

The pier, as now designed, together with the remains of the old pier, will then have a width (125 feet from the head of the pier) of sixty-six feet, diminishing, on the one hand, at the outer end, and on the other, at the shore, to fifty feet. The space between the line of the new work and the inner line of the old work, with the exception of that portion, probably, of the outer end, not covered by the east pier from the waves that roll in from that direction, will, in the course of a few years, be filled with the sedimentary matter of the lake, and thus further compact and secure the works. Should it be desired to form landings on the pier, this may be effected by piling along the present interior line and planking over to the new work, thus affording accommodation equal to the dimensions above given.

The Board deems it proper to say, that the recommendations contained in this report are based upon the present condition of the west pier, as exhibited on the detailed map of Captain Stansbury's survey of 1853.

A tracing of the west pier from the map, on the large scale of the recent survey, with the pier work now proposed, drawn on it in red; also, a general plan of the works is herewith submitted, as convenient to the clear understanding of the present report, also an estimate to shew that the measures recommended may be carried out with the means now available for the harbor.

I have the honor to be, sir, very respectfully, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Engs., Pres't Board.

Col. J. J. ABERT,
Bureau Topographical Engineers.

Estimate to reconstruct the west pier, Cleveland harbor, Ohio, agreeably to the plan of the Board of Engineers of Lake Harbors and Western Rivers, of this date.

25 cribs, 30 feet long, 12 feet wide, and 16 feet high, at $600		$15,000 00
2.....do.....20.....do.....do.....at $820		1,640 00
Compensation of agent, 365 days, at $4		1,460 00
		18,100 00
Contingencies, 10 per cent		1,810 00
		19,910 00
Balance in the treasury	$20,545 49	
Balance in disbursing officers' hands April 1, 1854	267 26	
Remitted to disbursing officers May 25, 1854, and with the above balance, or materials purchased therewith, supposed for the most part still available	5,000 00	
Total amount available		25,812 75
Balance over estimate as above		5,902 75

JAMES KEARNEY,
Lieut. Col. Top. Engineers, Pres't Board.

OFFICE BOARD OF ENGINEERS OF
LAKE HARBORS AND WESTERN RIVERS, *Washington, May* 27, 1854.

NOTE.—The estimate, calculating the whole number of cribs as 20 feet cribs, at $820, and adding the compensation of an agent, with the usual per centage for contingencies, would reach $25,960, exceeding the available means but $147 23.

Memorandum respecting Cleveland harbor.

OFFICE BOARD OF ENGINEERS
LAKE HARBORS AND WESTERN RIVERS,
Washington, July 15, 1854.

Captain Stansbury, it is understood, proposes to extend the pier forming the west side of the entrance to Cleveland harbor —— feet further into the lake, or about —— feet in advance of the head of the east pier, and the reason for this proposition is the protection that such extension would give to vessels rounding the western pier head during gales of wind from the westward, for it is alleged that during heavy westwardly weather the sea breaks with some violence upon the head of that pier, and that, owing to the proximity of the east pier, vessels coming from the westward are in danger of falling foul of the latter. To this it is objected that the sea breaks upon the head of the pier which is founded in twelve feet water, because of the dilapidated state of the work, and because the surface of the inclined plane of loose stones, mentioned in the report of the Board, rises above the bottom of the waves; and that inasmuch as the proposed new work would present a vertical front to the sea in deep water, we would no longer have reason to apprehend the presence of breakers there. Moreover it is known that the great storms here do not always proceed from the westward, but on the contrary that they frequently blow from the northeast, the *prevailing winds* coming nevertheless from the westward. Now, if such be the case, the reasons that favor an extension of the west pier are equally favorable to and call for an extension of the east pier, with a view to the safety of vessels attempting the entrance when coming from the east during heavy gales from the eastward.

If the facts on which this view of the subject are founded prove to be correct, we are unavoidably led to the conclusion that as there is already a sufficient depth of water at the entrance, neither of the piers should be prolonged for the purpose mentioned in the beginning of this note, nor with the view of deepening the channel. As to the question of the prevailing winds and great storms, we have the testimony of the lake navigators, and the evidence derived from the sand which has accumulated against the piers one ach side of the structure landward, and we find from these the verification of the fact that the storms at Cleveland come from the eastward as well as the westward.

Undoubtedly there will be always some care required in making the harbor in stormy weather (either easterly or westerly) for the width between the piers is only two hundred feet, and somewhat hazardous in the case of vessels that do not answer their helm quickly, or of those which happen to be carelessly or unskilfully managed, to attempt the passage in a storm. This want of room between the piers is now beyond remedy, but already intimated, the danger by which vessels are threatened in entering will very probably be altogether or very nearly obviated by applying to them the principles of construction which the Board has had occasion so often to advocate, namely, the vertical form of the profile, with a plain continuous surface, or one as

nearly so as practicable, extending from the top of the pier to the bottom of the greatest waves, or to some manageable depth below them.

J. K.

BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, July 12, 1854.

SIR: In relation to the plan of improving the navigation between Lake Huron and the Sault St. Marie, Michigan, referred to this Board, I am instructed to report that having carefully examined the charts embracing this portion of the lake surveys, now in the bureau, together with the correspondence of Captains Macomb and Scammon in relation to the same, the Board has seen reason for adopting the views of the subject presented by Captain Scammon in his letter of June 7, 1854, a copy of which is hereto annexed, and has accordingly the honor to submit the annexed estimate of the cost of carrying the same into effect.

Very respectfully, I am, sir, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Engs., Pres't Board.

Col. J. J. ABERT,
Bureau Topographical Engineers.

Estimate of the cost of improving the navigation between Lake Huron and the Sault St. Marie, (Michigan,) viz:

Dredging in the channel on the westwardly side of Lake George in order to command the requisite depth and width (600 feet wide and 12 feet deep) throughout the channel, 22,222 cubic yards, at 15 cents per yard	$3,333
Establishing channel marks, buoys, landmarks, &c., along the channel of Lake George, and along the Neebish rapids, say	2,167
Superintendence and contingencies	1,500
JULY 12, 1854.	7,000

DETROIT, *June* 7, 1854.

SIR: In obedience to your orders of the 16th ultimo, I have been to Lake George and the East Neebish, River St. Marie, and have the honor to submit the following report, viz: I. I find the water at the south end of Lake George *thirteen inches* lower than when I made the survey of last year. But this difference is not constant throughout the lake, although it is, perhaps, as nearly so as the difference in the direction of the wind, at the time when the soundings were made, could lead us to expect. Ex. qr. Last year the water on a certain rock in place, at

the head of the Neebish, was *twenty* inches deep; this year it is but *seven*. Last year there was a depth of *eight feet* on the bar at the head of the British, or eastern channel, while this year there is *seven-and-a-half*.

The western channel of Lake George is as nearly like that given by the survey of last year as the difference in the stages of water could exhibit on making the more minute soundings of the present year. It is of ample width, say *two thousand feet*, for the greater part between the nine feet curves; and nowhere less than seven-and-a-half feet for the same width, except at a point midway between its two extremities, where the channel can safely give but seven-and-a-half feet, with a width of some 500 feet. But this part is not of more than 200 feet extent in the direction of the channel, and the bottom is of mud, to the depth of three feet. I ventured, therefore, to take the steamer E. K. Collins, Captain Jones, through this channel, although perfectly aware that, from my ignorance of steamboat navigation, I could not do so without the risk of touching on one or other banks, or upon some small mounds of mud covered with sand, that form a kind of "middle ground" near the southwestern extremity of the channel. I would however remark that in the only difficult part of the passage no serious obstacle was encountered, and where the boat *did* touch upon the smooth bottom (for there are no rocks on the west side of the lake) there was, in fact, a channel on either side of over two fathoms.

The examination just finished confirms the opinion which I expressed in a former report, that the west side of Lake George offers the only channel perceptible of such permanent improvement as can satisfy the requirements of the rapidly-increasing commerce of the River St. Marie.

1. Because it is three times wider than the old channel.

2. Because the current is very slight on this side of the lake, and comparatively rapid on the other; leading to the conclusion that the process now going on, of filling up, on and above the bar of the British channel, will continue, while the western or American channel remains unchanged.

3. Because the bottom of the western channel is mud, guarded by clay banks, rendering the work of dredging both certain and permanent; while the east channel presents *quicksand* under a coating of sand and hard clay.

4. The eastern channel is completely within the territory of Canada, while the western lies wholly within that of the United States.

For these reasons, I think there can be no doubt as to the point where the improvements so necessary to the commerce of Lake Superior should be made.

Besides the dredging required to clear the channel, it will be necessary to have small permanent beacons, at its upper, lower, and middle points, when its navigation will be as easy as that of the Detroit.

II. On a careful examination of the East Neebish, I find the western channel all that my map of last year promised. It requires no improvement, since it can be safely navigated by vessels drawing anything under twelve feet. But it is requisite that permanent works should be established on shore, to guide vessels through the passage;

for such is the rapidity of the current, that a slight error in steering would probably lead to serious disaster.

There is no doubt of its being by far the best channel, indeed the only safe one, through the Neebish.

According to your instructions I have established such marks as will enable any one to pass up and down with safety during the present season, by observing the following "sailing directions."

Vessels bound up should keep midway between the northwest end of St. Joseph's, and the southeast end of Sugar Islands, until they open a cut across the point on the northwest side of the *rapids*; thence keeping the cut open until reaching a point midway of the rapids, two white stations or signals are brought in range through a cut on the left, or port hand; thence steer for a white station on the eastern shore, and near the head of the Neebish, until the point at the northwest end of the channel is fairly opened, and then keep the middle channel until entering Lake George.

Vessels bound down should keep the middle channel until they bring two stations or signals in a cut at the lower extremity and on the right hand of the rapids in range, and then keep them in range until midway of the rapids, they come in range of the two stations on the right, at which vessels bound up are directed to change their course; thence keep the middle channel to the end of the Neebish.

I have safely conducted the steam propeller *Dart*, towing two large scows, up this channel, the steamer *Northerner* down, and the large steamer *E. K. Collins*, both up and down.

Very respectfully, &c., &c.,

E. P. SCAMMON,
Captain Topographical Engineers.

Captain J. N. MACOMB,
Top. Eng. U. S. Army, Com'g Survey of N. and NW. Lakes.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, July 19, 1854.

SIR: I have the honor to submit the plan of the Board in reference to the harbor of Dunkirk, on Lake Erie.

The estimate of the Board amounts to.....	$192,600
The appropriation in reference to this harbor in the law of August, 1852, was for $30,000; of which amount there yet remains in the treasury undrawn.....	28,310
Which leaves as yet to be provided in order to meet the plan of the Board.....	164,290

The Board supposes that six years will probably be occupied upon this work.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Col. Corps Top. Eng.

Hon. JEFFERSON DAVIS, *Secretary of War.*

The Board will report a plan for expending to the best advantage the amount available for the work, including therein nothing that cannot be executed with the funds on hand.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *August* 26, 1854.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, August 30, 1854.

SIR: I have the honor to submit the revised report of the Board in reference to the harbor of Dunkirk, Lake Erie, made in pursuance of the directions of the honorable Secretary of the 26th instant.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Colonel corps Topographical Engineers.

Hon. JEFFERSON DAVIS,
Secretary of War.

Approved:

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *September* 14, 1854.

OFFICE BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, July 12, 1854.

SIR: The attention of the Board of Engineers having been called by the bureau to the plans and estimates for the improvement of the harbor of Dunkirk, New York, I am instructed to make the following report in relation thereto.

The old works consists—

1. Of the west pier of 1,830 feet, extending from the west shore from a point of 1,500 feet within Light-house Point, on a course of N. 61° E. to the west channel, and is founded in all the various depths to twelve feet water.

2. The main work or breakwater, as it is generally called, lies on two courses, one E. and W. for 340 feet, the other N. 62° E. for 1,340 feet, and is separated from the west pier by the west channel, which here has a width of 425 feet, the work being founded in depths of seven to eight feet. This work, it is understood, was eventually to extend over the same shoal ground by a further length of 1,330 feet on a course N. 82° E. to the east channel nearly; and—

3. The middle or detached pier, 300 feet in length on a course N. 31° E., lying within and covering the gap between the first two described works, at the distance, at the nearest point across the channel, of 300 feet. The entire length of these works, including that part of the breakwater not constructed, is 5,140 feet.

The works of this harbor are at present in a very dilapidated condition. Of the breakwater, the tops of a few large stones on the east

end, and about a dozen piles are all that appear above water. The west pier is in the same condition, with the exception of a few piles near the shore. The head of the pier is a square of twenty-five feet, rising eight feet above the water. It is of masonry, and, though rough, is good, with the stones of the upper course cramped with iron. A light beacon of wood stands on this pier. The accumulation against the pier itself and its ruins is considerable, and is probably on the increase. The middle or detached pier is entirely gone, say four to six feet below the surface of the water. On the channel end of the ruins of this pier a day beacon, recommended by the Board, has been erected. There is also a day beacon near the west end of the breakwater.

It was erected by the New York and Erie Railroad Company on a pier thirty-three feet by thirty feet, raised six to eight feet above the water. These beacons are formed of four timbers of about thirty feet in length, rising from a base say of twenty feet, and meeting at the top; the upper half being boarded and painted, the middle or detached pier beacon, black and white; the breakwater beacon red and white.

The improvement of this harbor, together with a majority of the others on the lakes, was assigned to the bureau in August, 1838. An appropriation of $10,000 had just been made, and had been expended in repairing and finishing the works, all of which had already been founded, and even at that early period had become greatly dilapidated. From 1838 to the present time, there have been but two appropriations for the harbor, namely: one in June, 1844, for $5,000, the other in August, 1852, for $30,000. The appropriation of $5,000 for repairs of the works being wholly inadequate for the purpose, was applied to securing the head of the west pier, on which stands the beacon light. The funds last appropriated are for the most part still available.

As the views of the Board with respect to structures exposed to the waves are directly opposed to the principles involved in founding the works of this harbor, it cannot consistently recommend their reconstruction. These views have already been explained in former reports. It is necessary, therefore, on the present occasion, to revert to them only so far as to show in what respect the works in question do not conform to them. The vertical profile, it is true, is in every case adopted; but as the works are founded in depths which allow the waves to strike in the first instance upon the bottom, cutting off the oscillatory motion, and as a consequence changing it into a horizontal one, the principle on which rests the propriety of presenting a vertical face to the action of the waves is substantially vitiated.

If it be true that the vertical profile is the best for works founded in depths which admit of the free oscillatory motion of the waves, it must also be conceded, from the same course of reasoning, that in depths insufficient for the water to perform that movement the vertical profile is the worst, for the reason that it presents a face on which the impact of the waves under the change described is received with the greatest effect.

Dunkirk harbor is a bay indenting the shore line of Lake Erie to the depth of three-fourths of a mile nearly, with a breadth at its mouth of one and seven-eights miles measured between the outer points, Lighthouse Point and Battery Point. The anchorage and landings off the

town are exposed to all winds proceeding from points in the arc from westnorthwest round by the north, to northeast nearly, for or 112° 30′, and are sheltered from all winds on the land side between these points, or for 247° 30′. The improvement of the harbor, unlike those at most of the harbors of the lakes, is confined to forming a safe anchorage and landing at the town, as that portion of the exposed arc, as given above, lying between a line to the nine feet curve and a line to Battery Point includes shoal ground, over which, from its extent, waves of great altitude are not likely to pass. It may very properly be excluded from consideration in any plan for making a secure harbor, or at all events, until such time as the essential parts to secure this benefit shall have been fully carried out. This arc extends from a line north by east ½ east nearly (north 17° east) to northeast nearly (north 43° 30′ east), or 26° 30′, thus reducing the arc of exposure through which protection is required, to the arc between Light-house Point westnorthwest (north 67° 30′ west) and the nine feet curve north by east ½ east nearly, (north 17° east,) or to 86°. Of the exposed arc thus reduced, the works heretofore constructed covered from Lighthouse Point westnorthwest (north 67° 30′ west,) to the east end of the breakwater, north by west ½ west nearly, (north 18° west,) or 49° 30′, leaving still unprotected that part of it between the east end of the breakwater and the nine feet curve, or 36° 30′.

As the Board, as already stated, cannot with the views entertained by it recommend the restoration of the old works, it is now proposed to show that the protection required may be given by new works that shall not be obnoxious to the objection, which it is conceived belong to the old series.

These works consist of three breakwater structures. The principal or central one on a line drawn from Light-house Point to Battery Point; the second west and inland of, and parallel to the first; and the third, east and lakeward of the main work, and slightly inclined to it, or in a direction S. 77° W. from Battery Point. The west breakwater is limited towards the west by a point 300 feet from a line drawn from the head of the present west pier to Light-house Point, and towards the east, by a northwest line drawn from the west end of the present breakwater, and is in length 1,000 feet. The main breakwater is limited towards the west by a line drawn perpendicular from a point 500 feet on the prolongation of the line of the west breakwater, and towards the east by a length of 2,890 feet; and the east breakwater is limited towards the east by a line drawn from a central point at the landings, tangent to the 9 feet curve, and towards the west by a length of 765 feet. These works cover essentially the entire exposed arc lying between Light-house Point on the west, and the 9 feet curve on the east. Protection is afforded not only to vessels lying in the inner harbor, but to those entering or leaving it by the channels, and besides an outer harbor is formed, between the old and the projected works, that will serve as a harbor of refuge when provided with suitable moorings, made necessary by the absence of a sufficient holding ground.

Besides the two entrances of 500 feet, provided for by the design, between the works, there is one between the shore end of the east

breakwater and the 9 feet curve of 250 feet. To fulfil the condition of protection, the entire length of the two smaller breakwaters will be necessary. It may on the other hand be found in the progress of the operations, that a portion of the main or central breakwater from the protection afforded by the shoalest part of the reef between it and the shore may be dispensed with. To be able to take advantage of this contingency, the work should be commenced at the ends, and proceed inward until the desired protection is afforded.

The works are founded in about 18 feet water, and cover from the northwest winds an area of 97 acres, having a depth of 12 feet and upwards.

An estimate of cost of the foregoing design is herewith submitted. Also a tracing of Dunkirk, with the proposed works delineated thereon.

Very respectfully, I have the honor to be, sir, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Eng., Pres't Board.

Colonel J. J. ABERT,
Bureau Topographical Engineers.

Estimate of the cost of constructing Dunkirk harbor, New York, agreeably to the plan of the Board of Engineers of Lake Harbors and Western Rivers, dated July 12, 1854.—*Time six years.*

Cost of one crib, 30 feet by 20, and 23 feet high—	
46 side pieces, 12 feet by 12, and 31 feet long, 1,426 feet, at 10 cents	$142 60
23 stringers, 12 feet by 12, and 30 feet long, 690 feet, at 10 cents	69 00
69 ties, 12 feet by 12, and 20 feet long, 1,380 feet, at 10 cents	138 90
9 bottom timbers, 12 feet by 12, and 30 feet long, 270 feet, at 10 cents	27 00
71 cords of stone, at $7	497 00
1,300 pounds of 1½-inch iron drift bolts, at 6 cents	78 00
1,539 feet, board measure, pine plank, at $14	21 42
43 pounds 6-inch spikes, at 7 cents	3 01
Carpentry and labor	85 00
1 snubbing post	25 00
Cost of one crib	1,086 03
Western breakwater, 33⅓ cribs, at $1,086 03	36,201 00
Middle breakwater, 96½ cribs, at $1,086 03	104,620 89
Eastern breakwater, 25½ cribs, at $1,086 03	27,693 76
	168,515 65
Compensation of agent for 6 years, 183 days, at $4, and 182 days, at $2 in each year	6,576 00
	175,091 65
Contingencies, 10 per cent	17,509 16
Total amount	192,600 81

OFFICE BOARD OF ENGINEERS OF
LAKE HARBORS AND WESTERN RIVERS, *Washington, July* 12, 1854.

OFFICE BOARD OF ENGINEERS OF
LAKE HARBORS AND WESTERN RIVERS,
Washington, August 29, 1854.

SIR: The report of the Board for the improvement of the harbor of Dunkirk, New York, dated the 12th ult., having been returned to the bureau with the following endorsement by the Hon. the Secretary of War, of the 26th inst., to wit: "The Board will report a plan for expending to the best advantage the amount available for the work, including therein nothing that cannot be executed with the funds on hand," I am instructed to make the following report, accompanied by the requisite estimate in compliance therewith.

It is stated in the report of the Board above cited, that "the anchorage and landings off the town are exposed to all winds proceeding from points in the arc from WNW., round by the north to NE. nearly, or for 112° 30′, and that as a portion of the exposed arc, as given above, lying between a line to the nine feet curve and a line to Battery Point includes shoal ground, over which, from its extent, waves of great altitude are not likely to pass, it may very properly be excluded from consideration in any plan for making a secure harbor." In the final design of the works, this portion of the arc was so excluded, reducing the arc requiring protection from 112° 30′ to 86°. Of this reduced arc, however, there is still a marked difference in the protection already afforded, because of the unequal depths embraced by it, as seen in the west or main channel and the shoal ground on either hand. And it is in view of this difference that I am instructed by the Board to recommend the application of the present available means of the harbor to the construction of the west breakwater, as in NW. winds it will cover not only the entrance between the present ruined piers, but also the deep water in front of the landings and anchorage at the town, over which, as a consequence, the least protection is now afforded against the approach and violence of the waves.

The original report of the Board on Dunkirk harbor, inclosed in the letter of the bureau of the present date, calling attention to the endorsement of the Hon. the Secretary of War thereon, is herewith returned.

I have the honor to be, very respectfully, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Eng., President of Board.

Col. J. J. ABERT,
Bureau of Topographical Engineers.

Estimate of the cost of carrying out a plan "for expending to the best advantage the amount available" for Dunkirk harbor, New York, "including therein nothing that cannot be executed with the funds on hand," made under instructions from the honorable the Secretary of War, of the 26th instant.

22 cribs, 30 by 20, and 23 feet high, for 660 feet of the eastern end of the west breakwater, at $1,086 03....	$23,892 66
Compensation of agent for one year, 183 days, at $4, and 182 days at $2.....	1,098 00
	24,990 66
Contingencies, ten per cent.....	2,499 06
Total amount.....	27,489 72
Amount available.....	28,310 78
Balance.....	821 06

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, July 17, 1854.

SIR: I have the honor to submit the plan and views of the Board in reference to the harbor of Dubuque.

The estimate of the Board is for.....	$23,926
There remains undrawn in the treasury of the appropriation of August, 1852, in reference to Dubuque harbor.....	5,016
Leaving yet to be provided, in order to meet the views of the Board.....	18,910

It may be proper to remark that the Board has made no estimate for the construction of a suitable dredge-boat, being of the opinion that the price estimated for constructing the embankment will also cover the expense of a dredge-boat, and that much of the embankment can be made with the material excavated in dredging.

Respectfully, sir, your obedient servant.

J. J. ABERT,
Colonel Corps Topographical Engineers.

Hon. JEFFERSON DAVIS,
Secretary of War.

The Board will report a plan for expending to the best advantage the amount available for the including therein nothing that cannot be executed with the funds on hand.

JEFFERSON DAVIS.
Secretary of War.

WAR DEPARTMENT, *August* 26, 1854.

BUREAU OF TOPOGRAPHICAL ENGINEERS.
Washington, August 30, 1854.

SIR: I have the honor to submit the report of the Board in reference to the harbor of Dubuque, Iowa, revised by the Board in conformity with the order of the honorable Secretary, of the 26th inst.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Colonel Corps Topographical Engineers.

Hon. JEFFERSON DAVIS.
Secretary of War.

Approved:

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *September* 15, 1854.

BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, July 13, 1854.

SIR: In relation to the plan of improvement of the harbor of Dubuque referred to the Board, I am instructed to address to you the following report:

The city of Dubuque occupies a position on the westerly side of the Mississippi river, from the main navigable channel of which it is separated by a cluster of flat alluvial islands and intervening sloughs or shoal channels, the former varying in width from 100 to 600 yards, and the latter from 50 to 600 feet. Immediately above the town site, and contiguous to the same, is a broad and shoal water-field, called Lake Perosta, one-third of a mile wide, and nearly one and a half miles long, from which, as also from the sloughs above mentioned, steam navigation is almost entirely excluded in very low stages of the river. The westerly shore of the river is rendered inaccessible to steam navigation in low water, on a distance of more than a mile below, and nearly three miles above the city, by reason of the lake, sloughs, and islands.

The distance across the islands and sloughs, from the shore of the river to the main channel, varies from 580 to 700 yards. The extent of the obstructions along the river, from the head of the uppermost to the foot of the lowermost island, is about four miles.

The total fall or vertical descent of the river in this distance is a little less than one foot, or three inches per mile. The river current is, of course, gentle in all stages, varying from one mile in low water to three miles in high freshets, in the main river, and moving with less than half the same velocities in similar stages through the sloughs, &c. The depth of the low water channel of the river on the distance mentioned, varies from ten to twenty feet, while that of the sloughs communicating with the harbor is limited to two feet, or to such a depth that boats drawing two feet cannot enter the harbor.

The Mississippi river, both above and below the islands, has a mini-

mum channel depth of at least four feet, in extreme low water. Hence it is manifest that steamers adapted to low water navigation of the river, or those drawing four feet, cannot reach the city landings, or enter the harbor, in the present low water condition of the sloughs.

A multiplicity of expedients, having for their object the formation of a navigable low water channel leading from the main channel of the river through the sloughs, and across these islands to the city landings, have been suggested by different individuals. No less than nine different methods were proposed and reported upon in December, 1844, by Captain Crane, of the Topographical Engineers, who, with the aid of Joshua Barney, esq., had made a careful examination and survey of the harbor, and prepared a chart exhibiting the topographical and hydrographical features of the islands, sloughs, and a portion of the river in the vicinity of the city.

The estimated cost of executing the several methods reported by Captain Crane varied from $10,277 to $64,875; the average cost of the several methods being $30,302, and the cost of the method deemed most feasible and effectual by Captain Crane being upwards of $43,000.

The various methods referred to contemplated the formation of channels leading in various directions through the sloughs, along the river shore, and across the islands at, above, and below the town site. The widths proposed for the channels vary from 60 to 200 feet, while their low water depth is uniformly four feet.

The efforts hitherto made towards the improvement of the harbor consist mainly in attempts to widen and deepen the natural channels communicating between the main river channel and the harbor, and in opening new channels across the islands at certain points, for the purpose of rendering access to the harbor more direct and easy than by pursuing the devious channels heretofore used.

The accompanying chart exhibits a plan of the harbor, islands, sloughs, &c., lying between the city landings and the main river; also the several positions at which attempts have been made for the purpose of enlarging old channels, and opening new ones to connect the harbor with the main channel of the river, and rendering the former accessible to steam navigation in all stages of water.

Explanations of the Chart.

The chart is transcribed from surveys and drawings executed by J. Barney, esq., in 1844, under the direction of Captain T. J. Crane, of the corps of Topographical Engineers, the scale of projection being one foot, or twelve inches to the mile. The original map embraces an extent of about four miles, commencing at Eagle Bluff, nearly three miles above Dubuque, and terminating a little more than a mile below the city, near the lower end of the lowermost island of the cluster. It includes all the islands, sloughs, pools, and projected canals and channels, in the vicinity of Dubuque, on the westerly side of the river.

The transcript or copy, herewith, embraces an extent of about one and a quarter miles, commencing near the upper extremity of the town site and terminating a little below the site. It also embraces a portion

of the town site of Dunleath on the easterly side of the river, the position of which, as also the configuration of the shore, &c., on that side have not been defined on the original map. These features, however, have been presented in the transcript agreeably to the best lights that can be had on the subject.

The commercial importance of Dubuque has been greatly enhanced by an enactment of Congress which recognizes its site as the northerly terminus of the Central Railroad of Illinois, and involves the necessity of a bridge across the Mississippi, connecting the new town of Dunleath with the city of Dubuque, consequently, it becomes proper and advisable that the improvement of the harbor should be made with special reference to the destinies that await the accomplishment of this great enterprise. With these views of the subject, a plan differing from those above considered has been proposed by a member of the Board, who is familiar with the subject, and has been adopted by the Board, not only as the most efficient and permanent mode of improvement, but as the most convenient and eligible also for connecting the business of the railroad with the trade and commerce of Dubuque.

The details in relation to the efforts that have already been made towards the improvement, and to those now proposed to be made for the same object, in connexion with the railway, will be considered in the explanations now to be given, which are as follows, viz:

R R. Line of a projected canal along the river, the shore connecting the harbor with Lake Perosta, and continued thence upward along the shore to Eagle Bluff.

r r. Line of same channel continued downward through the inner slough, and near the shore to the lower extremity of the lowermost island.

S. A proposed artificial channel across Juner island, connecting the harbor with the outer slough, near the head of the basin, and continued upward in the slough quite to its head near Eagle Bluff.

T. Artificial channel across Juner island, connecting the harbor with the main river channel, through the natural channels W and X.

V V. Projected artificial channel across the outer island, leading in nearly a straight direction from the city landing of Dubuque to the ferry landing on the easterly shore of the river.

W W. Main outer slough situated between the inner and outer islands.

X X. Main natural entrance from the river to the harbor, crossing the outer island.

Y. Curved line of piles intended to obstruct the flow of water downward in the outer slough, and to promote and facilitate the improvement of the channel at X.

Z. Z. Artificial channel, called Waples cut, leading across the inner island, and connecting the main entrance at X with the inner slough, at a point a little below the city landing.

Remarks.

The canal R has been partially excavated, but has not been rendered navigable in low water.

The channel r. leading from the harbor downward through the inner slough, to its lower extremity, has been partially improved by dredging at and near the basin, but as yet inadequately opened at any point.

The proposed cut at S has not yet been commenced, and the propriety of opening it is very questionable, because of the extensive excavations required in the outer slough, in order to render the latter navigable to its head in low water, which appears to have been the object of the channel in this direction.

The cut at T has been formed, and appears to answer the purposes for which it was intended, so far as these purposes were attainable, prior to the completion of the plan of improvement of which it is merely a part; the residue of the plan embraced the opening of a similar cut across the outer island of much greater extent at V, leading in nearly a straight direction towards the ferry landing, on the east side of the river. The cut last mentioned has been commenced, but it falls far short of being finished. The propriety of its completion may be regarded as very questionable. The projected width of the cut is less than half the width required for the free passage of steamers, its length is about eight hundred feet, and the direction as well as the speed with which the water would flow through it very doubtful, and it would be liable to be choked with drift and sediment on the occurrence of every considerable freshet.

A portion of the main outer slough at W serves as a channel through which, and the artificial channel at T, an entrance into the harbor is effected, but cannot be made sufficiently commodious without additional dredging to a very considerable extent.

From W the line of communication is continued through the channel X to the main navigable channel of the river; but the navigation through it is obstructed at low water by several impassable shoals, across which the channel requires enlargement by dredging. The entire channel through T, W, and X is devious and crooked in a high degree.

The line of piles at Y appears to have answered no valuable purpose, and most, if not all, of the piles have been extracted and removed either by design or by accident.

An artificial channel, called Waple's cut, has been formed at Z at the expense of the corporation of Dubuque, as is supposed, and leads directly from the main river channel through X to a point in the inner slough a little below the city landing. This channel requires additional dredging in several places, and may be continued upward through the slough and along the river shore, to any desirable extent, by the same means. This channel, so extended and enlarged, may be safely regarded as more feasible and advisable than any of the improvements heretofore proposed, because of its shortness, the comparatively small amount of dredging requisite to its formation, and the greater facilities afforded by it for ingress and egress between the river and the harbor.

Plan of improvement now proposed.

Under existing circumstances the plan now to be considered is deemed preferable to either of those treated of under the preceding heads, for the following and various other cognate reasons, viz: It involves greater

simplicity, uniformity, and economy. It combines less extent with greater capacity of channel, and affords greater facilities of ingress and egress for navigation. It provides for greater stability, durability, and efficiency of structure. It contemplates a more convenient and easy connexion with the railway communications stretching from Mobile and New Orleans to the junction of the Ohio and Mississippi, and thence, via La Salle to Dubuque, and with other projected railroads; thence to the northward, westward, and southward, and affords greater facilities for intercourse in all directions, both by land and by water, than either of the plans previously noticed.

The plan now under consideration contemplates the construction of a causeway, embankment, or dike of earth, extending entirely across the islands and sloughs, in the position indicated on the chart, with its summit elevated four feet above the surface of the highest known flood, (viz: the flood of 1844.) The length of the causeway to be about 1,700 feet; its summit width or grade, 45 feet; its width at base, 30 to 135 feet; its heights, 10 to 36 feet; average height, about 15 feet; its upper slope 1½ to 1 foot; lower slope 1 to 1; and its carriage way, (McAdamized,) 30 feet wide. Its entire length, including pier-head and slopes at the outer end, to be about 2,000 feet; and its magnetic bearing, which is intended to be coincident with the line of the proposed bridge, about S. 68° E. True bearing S. 76° 05′ E.

In accordance with the foregoing dimensions the proposed causeway, or embankment, will contain 60,208 cubic yards, to which may be added, for a sloped wharf or landing, faced with stone at the outer end of the causeway, (300 feet long and 45 feet wide,) say 5,312 cubic yards; and we have for the aggregate contents of the work 65,520 cubic yards. The landing at the outer extremity of the causeway should present a slope declining towards the river at the rate of one in six, and should be substantially faced with the customary wharf pavement of stone, and should be sloped downward in the direction of the stream, at an angle of about 3°, or 1 in 19, and be paved with broken stone. The wharfing should be curved around the deflection at the junction of the river and harbor channels, and might be continued thence towards the city landing, and along the upper slope of the causeway to any desirable extent. A paved ramp in the direction last mentioned will not be needed for the protection of the causeway from the abrasion of water currents, for in this locality the current will not be likely to exceed one-and-a-half miles per hour, in the highest flood, while in lower stages it will be limited to half that speed, and perhaps less. The ramp thus extended, though not required for the protection of the causeway, may be found beneficial as an enlargement of the city landings, with which it may hereafter be connected.

Earth requisite and suitable for the formation of the causeway may very conveniently be procured from the proposed new channel, which is to be opened immediately above and alongside of the line of the work, (or it may be procured elsewhere, if found more convenient.) The proposed width of the channel is 200 feet, and its low water depth four feet. On arriving near the city, the channel may be deflected up stream on a gentle curve, and extended along the shore to any desired distance.

The excavations of earth required in opening the new channel, inclusive of the portions of the two islands intended to be removed, will probably be about equal to the earthy contents of the causeway, and can be readily applied to the formation of the latter.

Illustrations on the chart.

Fig. 1. Plan of the harbor, causeway, &c.

Fig. 2. Section across the islands, sloughs, &c., on the line of the causeway, and projected bridge upon the Central Railroad of Illinois.

Fig. 3. Section of the causeway or embankment trending about S. 76° 05′ E. True.

A B. The causeway 1,700 feet long and 45 feet wide at summit.

B C. Line of projected bridge about 3,000 feet in length.

D. The position of a draw, opening 80 feet wide between the draw piers.

a, b, c, B. Proposed new channel, which may be deflected at a, and extended upward to d; width 200 feet, and low water depth four feet throughout.

B C. Pier head, paved ramp and sloped grade at the outer end of the causeway.

I have the honor to be, very respectfully, your obedient servant,

JAMES KEARNEY,
Lieut Col. Top. Engineers, President Board.

Col. J. J. ABERT,
Bureau of Topographical Engineers.

Estimate.

Formation of causeway, 65,520 cubic yards of earth removed from new channel and placed in embankment, at twenty cents per cubic yard	$13,104 00
Broken stone for macadamized pavement on summit grade of embankment 30 feet wide and 9 to 10 inches thick, 3,000 perches, at $2 50 per perch	7,500 00
Stone pavements for ramp or slope at the pier head of the causeway, and applying the same, 600 perches, at $3	1,800 00
Superintendence and contingency, say	1,522 67
Amount of estimate	23,926 67

JAMES KEARNEY,
Lieut. Col. Top. Engineers, President Board.

OFFICE BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, August 29, 1854.

SIR: The report of the Board in reference to the harbor of Dubuque, Iowa, of the 13th July last, having been returned to the bureau with the following endorsement, made by the honorable Secretary of War, on the 26th instant, to-wit: "The Board will report a plan for expending to the best advantage the amount available for the work, including therein nothing that cannot be executed with the funds on hand."

I am instructed to make the following report, accompanied by an estimate, as called for by the honorable Secretary:

From an examination of the returns in the bureau, it appears that of the appropriation for the improvement of the harbor, approved August 30, 1852, an unexpended balance of $4,516 still remains for expenditures for the improvement in question. In the opinion of the Board, this amount can be expended to advantage in excavating the channel immediately above the proposed causeway, and in forming a partial embankment of the excavated materials. On the upper line of the causeway, from the main river shore at Dubuque, to the outer island. The means being limited to the sum above stated, viz: $4,516, and the quantum of labor being greatly reduced below that contemplated in the report submitted by the Board on the 13th ultimo, the rate per cubic yard of excavating and embanking will be enhanced inversely, in a corresponding degree, and may fairly be estimated at twenty-five cents, instead of twenty cents per cubic yard, as provided for in the report just mentioned.

Accordingly the estimate will be as follows, viz:

Removing 18,064 cubic yards of earth from the channel, and placing the same in the embankment, at 25 cents.... $4,516

The excavations should be made along the bottom and sides of the proposed channel, to the depth of four feet, and to such width that steamers, &c., may be able to navigate the same from the main channel quite to the westerly shore of the river. In this way the work that may be done will include nothing that cannot be executed with the funds on hand, and at the same time will contribute towards the completion of the plan reported.

Very respectfully, I have the honor to be, sir, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Eng.

Col. J. J. ABERT,
Bureau Topographical Engineers.

The papers in the case are herewith reported.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, July 19, 1854.

SIR: I have the honor to submit the report of the Board of Engineers on Lake Harbors and Western Rivers in reference to the harbor of Kenosha, (formerly Southport,) on Lake Michigan.

The appropriation for this harbor under the law of August 30, 1852, was	$10,000 00
Amount drawn	8,084 79
Leaving yet undrawn	1,915 21
The estimate for the work by the Board is	20,128
Amount undrawn	5,210
Leaving, as yet, to be provided to complete the views of the Board	18,918

Respectfully, sir, your obedient servant,
J. J. ABERT,
Colonel corps Topographical Engineers.

Hon. JEFFERSON DAVIS,
Secretary of War.

Colonel Abert will report what part of the plan it is contemplated to execute with the unexpended balance on hand; and whether any assurances have been received that the remaining sum necessary to complete the plan will be furnished by the local authorities or citizens of the place.

By direction of the Secretary of War.

A. CAMPBELL,
Chief Clerk.

WAR DEPARTMENT, *August* 2, 1854.

BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, July 18, 1854.

SIR: In relation to the harbor of Kenosha, Wisconsin, a subject which has been referred to this Board by the bureau, I am instructed to make the following report.

The plans which have been referred to the Board in connexion with the harbor relate, in the first place, to the repairing, protecting, and perfecting of the existing works, and the deepening and defending of the channels, and are set forth in the letter of Mr. M. Gamble of the 21st of April, and in the plan which accompanies it; and, secondly, those which relate to the extension and completion of the work, as set forth in the report of Mr. S. Hale, the local agent.

Mr. Hale, who gives a plan for extending the present piers, is of opinion that the piers hereafter to be put in should be in a line with those already in, and he proceeds to defend this opinion upon grounds which seem to the Board not to have been well considered. He says in the report referred to that northeast storms are the worst which vessels have to encounter upon Lake Michigan, and therefore that the piers should incline a little to the southeast. The opinion of the Board is, on the contrary, that any extension of the piers at Kenosha should incline to the north of east, and on examining the plan of the harbor as it already exists, and as it is proposed to be extended, it is found that the line which he has drawn indicative of the prolongation of that pier is E. by N. nearly, (or N. 78° 45′ E.,) and is the course on which, in the judgment of the Board, the north pier ought to be built; and the south pier might be drawn precisely in prolongation of the south pier. Moreover, in the judgment of the Board, the piers need not extend into the lake beyond the depth of 12 feet, so that in conformity with this condition of the problem, the extension of the southern pier might be 180 feet, or six cribs, (each 30 feet long, 20 feet wide, and 17 feet high, reckoning from the bottom of the lake to the platform of deck of the pier;) and moreover to mask the southern pier, which is here incontestibly the leeward one. The northern pier should receive an extension of 210 feet, or of 7 cribs, of the like dimensions with the others. In taking these elements for its guide, the Board would have it understood that it does not receive them on the authority of Mr. Hale, the local agent, who is manifestly in error in relation not only as to his physical facts, but also as to the engineering principles which he advances in his report.

Conforming, however, to these views of the Board, the accompanying estimate marked A has been made, and it shows the probable cost of extending the piers at Kenosha, added to which is an item for raising the existing structure to the level which the Board has heretofore proposed for the minimum height of all the lake piers above the level of the lake, namely, five feet.

MR. GAMBLE'S REPORT.

Mr. Gamble, in his letter already referred to, limits his attention to the "work indispensably necessary to be done during the present working season of 1854." This includes:

1. Filling in with coarse gravel between the sheet piling and inside of the piers, to keep the same (sand) from washing into the channel.
2. For dredging a channel 160 feet wide to a depth of 12 feet, through the sand-bar out of and extending across the entrance of the harbor.
3. For dredging a channel 80 feet wide to a depth of 12 feet, the entire length of and between the harbor piers.
4. For dredging a channel 600 feet in length and 80 feet wide to a depth of 10 feet water, to connect with the river channel inside.
5. For sheet piling inside of the harbor.

6. For repairing and building up old sheet-piling at the west end of south pier.

7. For building and levelling up two cribs, one on the north and the other on the south pier on the east end.

Taking these items in their order, the Board has to observe, in relation to the first, that undoubtedly it is very important, with the view of preserving the channel between the piers, that measures should be taken for preventing the passage of sand through the sheet-piling. It is not believed, however, that clean gravel will be sufficient for that purpose, but that clay or mud, or a mixture of clay with gravel, may be found necessary. Believing that clay or mud may be had very convenient to the work, the sum affixed to the item may stand as in Mr. Gamble's estimate at $770.

2. The estimate for dredging a channel 160 feet wide to a depth of 12 feet, through the sand-bar outside of and extending across the entrance of the harbor, may stand, as stated by Mr. Gamble, at $288 90
And to that should be added the usual 10 per cent. for contingencies 28 89

Making a total of 317 79

3. For dredging a channel 80 feet wide to a depth of 12 feet, for the entire length between the piers. With reference to this item, the Board has to remark, that it can see no sufficient reason for reducing the channel-way to half the opening between the piers, which are 160 feet apart. It therefore proposes to double the quantity of excavation estimated by Mr. Gamble, viz:

11,000 cubic yards by 2, 22,000 cubic yards at 15 cents, or $3,300 00
To which, adding 10 per cent., would give 230 00

Or in all 3,630 00

4. For dredging a channel 600 feet long and 80 feet wide to a depth of 10 feet, viz: From the west end of the north pier to the river channel. The Board, accepting ten feet as a sufficient depth in smooth water, objects, nevertheless, that a width of 160 feet of water way ought to be maintained inside of, as well as between, the piers, and that, therefore, the cost of this item ought be increased, thus:

For dredging a channel 160 feet wide and 600 feet long, to 10 feet of depth, 28,000 cubic yards, at 15 cents $4,200 00
And contingencies, at 10 per cent 420 00

Making a total 4,620 00

and it has to observe also that the excavation referred to in the preceding article, and the sheet-piling noticed in article 5 ought to follow the

line indicated on Mr. Gamble's chart of April 19, 1854, viz: the line marked A B C:

5. For sheet-piling inside of the harbor. This item is accepted by the Board $808 19
6. For repairing and building up 150 feet of old sheet-piling at west end of south pier, (an item accepted by the Board) 366 74
7. For building and levelling up two cribs, one on the north, and one on the south pier, east end 613 30

Mr. Gamble proposes to raise the outer end of each pier to the height of five feet above the surface of the lake, the height heretofore proposed for such works as already mentioned. The Board sees no good reason for thus limiting this elevation, and recommends the raising up of each from the outer end to the present shore line. The change will increase the estimate by the difference between $613 30 and $2,043 25.

Recapitulation.

First item	$770 00
Second item	317 79
Third item	3,630 00
Fourth item	4,620 00
Fifth item	808 19
Sixth item	2,043 25
Seventh item	613 30
	12,802 53

ESTIMATE A.

Estimate of the cost of one crib 30 feet long, 20 feet wide, and 17 feet high		$871 25
Cost of 13 cribs of like dimensions	$11,326 25	
Estimated cost of work reported as being indispensably necessary to be done during the present working season of 1854, as above	12,802 53	
Total cost of the work proposed to be done at Kenosha		24,128 78

Respectfully submitted,

JAMES KEARNEY,
Lieut. Col. Top. Eng. Pres't Board.

KENOSHA, WIS., *April* 21, 1854.

SIR: In compliance with your request, I have made a survey of the harbor at this place, and herewith submit a map or chart showing its

present condition, together with an estimate of the work absolutely necessary to be executed during the present working season.

The first item in the expenditure is for 700 yards of coarse gravel for filling in behind the sheet-piling, and inside of the piers where the water washes the sand through between the timbers into the channel. This part of the work should be done as soon as possible.

The next in order is for dredging a channel 160 feet wide to a depth of 12 feet water, through the sand-bar 100 feet east of the end of the north pier, extending across the harbor entrance; this bar is only 60 feet wide from nine feet water on one side to nine feet water on the other. The least depth on it is seven feet water, or from 12 feet water on one side the distance across it to 12 feet water on the other side is only 100 feet. This is the only bar outside of the piers, as will be seen by reference to the line of soundings taken 18 feet apart, extending from the end of the north pier east to a depth of 24 feet water. It will also be observed that only 400 feet east of the end of the north pier the water is 20 feet deep. This is certainly favorable, and its advantages should not be neglected.

The next item for continuing the dredging of a channel 80 feet wide to a depth of 12 feet water, the length of and between the piers; this channel should be excavated close alongside of the north pier, where the least amount of dredging is required.

The last item of dredging in the estimate is for continuing the aforesaid channel 80 feet wide, with a depth of 10 feet water, 600 feet further, from C to A, at the same point, to connect with the main channel of the river.

The amount of dredging contemplated, if executed, would give a good safe channel for loaded vessels of the largest class, and render this harbor more accessible than any other on this shore of the lake, in their present condition, so far as my knowledge extends.

The sheet-piling, and building and levelling up of the two cribs on the outer end of the piers, specified in the estimate, are for the security of the pier ends, and to keep the surf from washing the sand into the channel at the west end of the piers.

The estimated quantity of each item I believe to be correct, but the actual cost of the workmanship will vary according to favorable or unfavorable circumstances on account of the weather, and the knowledge, perseverance, and energy of the superintendent and workmen.

Probably $1,000 should be added to the estimate for renewing and repairs of machinery and tools.

This report, examination, &c., are not extended as they might otherwise be, owing to the hasty manner in which they were necessarily made, for want of time which the press of other business has deprived me of.

I am, very respectfully, your obedient servant,

WILLIAM GAMBLE.

Hon. C. C. SHOLES,
Mayor of Kenosha, Wisconsin.

KENOSHA HARBOR, WISCONSIN.

Estimate for the improvement of the harbor, of work indispensably necessary to be done during the present working season of 185[illegible].

1. For filling in behind sheet-piling and inside of piers from C to D and from E to F, (see drawing) to keep the same from washing into the channel through sheet-piling and piers—	
147 cords or 700 cubic yards of coarse gravel, at $1 per yard	$700 00
For contingencies add 10 per cent	70 00
Amount required	770 00
2. For dredging a channel 160 feet wide to a depth of 12 feet water through the sand bar outside of and extending across the entrance of the harbor, (see drawing,) 1,926 cubic yards, at 15 cents	288 90
For dredging a channel 80 feet wide to a depth of 12 feet water (970 feet) the entire length and between the harbor's piers, 11,000 cubic yards, at 15 cents per yard	1,650 00
For dredging a channel 600 feet in length and 80 feet wide to a depth of 10 feet water from C, at the west end of north pier to A, to connect with channel of river inside, (see drawing) 14,000 cubic yards, at 15 cents	2,100 00
	4,038 90
For contingencies add 10 per cent	403 89
Amount required for dredging	4,442 79
3. For sheet-piling from B to A, (see drawing) 340 feet—	
544 feet timber for piles, at 8 cents per foot	43 52
340 feet timber for caps, 12 by 12, at 14 cents per foot	47 60
12,240 feet 3-inch plank, at $14 per M	171 36
8,160 feet 2-inch plank, at $14 per M	114 20
200 pounds spikes, at 9 cents	18 00
Workmanship	340 00
	734 72
For contingencies add 10 per cent	73 47
Amount required	808 19
4. For repairing and building up 150 feet of old sheet-piling 3 feet above water surface, at the west end of south pier, 450 feet timber, 12 by 12, at 14 cents per foot	63 00
350 feet timber, 12 by 12, for piles, at 14 cents per foot	42 00

568 pounds 1-inch square iron for bolts, at 5 cents per pound	$28 40
Workmanship	200 00
	333 40
For contingencies add 10 per cent	33 34
Amount required	366 74

5. For building and levelling up two cribs, one on the north and the other on the south piers at the east end—	
Siding—600 feet timber, 12 by 12, at 14 cents per foot	84 00
Ties—450 feet round timber, at 8 cents per foot	36 00
Clamps—100 feet 3 by 8 plank, at $14 per M	1 40
Iron—363 pounds 1-inch square iron for bolts, at 5 cents	18 15
Spikes—100 pounds 9-inch spikes, at 8 cents	8 00
Stone—30 cords stone, at $7	210 00
Workmanship	200 00
	557 55
For contingencies add 10 per cent	55 75
Amount required	613 30

Recapitulation.

1. For gravel, filling behind sheet-piling, and in piers	770 00
2. Dredging 26,926 cubic yards	4,442 79
3. Sheet-piling B to A, at west end of north pier	808 19
4. Sheet-piling, repairs of, at west end of south pier	366 74
5. Building and levelling up two cribs east end of north and south piers	613 30
Estimated total amount	7,001 02

WILLIAM GAMBLE.

KENOSHA, WISCONSIN, *April* 20, 1854.

OFFICE OF PUBLIC WORKS,
Kenosha, September 1, 1853.

SIR: Since I have had charge of the public works at this place I have, in accordance with your instructions under date July 14, 1853, made and am still making such repairs to the existing works as I have considered necessary.

I have removed the obstruction in the channel occasioned by the wreck of a schooner.

In my letter of August 7th I stated to the department that I thought

there were but few repairs necessary to be made for the protection of the existing works. On a more recent examination of the ends of the piers, which are left open, I find the action of the waves have worked out some of the stones during the recent storms, and I am fearful that when the ice forms and is thrown into the openings at the end of the piers that it will crowd them apart.

The best method I could devise to protect them was by putting in at the end of each a new crib, and protecting that by piles closely driven across the ends, which I am now engaged in doing.

I think the sum of one thousand or fifteen hundred dollars could be profitably expended in dredging a channel between the piers this fall. I also herewith enclose a chart of the harbor at Kenosha, and an estimate of the probable cost of completing the works at this place.

I am of the opinion that the piers hereafter to be put in should be on a line with those already in, (that is, inclining a little to the southeast;) for this reason, our northeast storms are the worst which our vessels have to encounter on this lake. If the north pier inclined to the northeast, the mouth of the harbor would be widened, allowing a greater rush of water and heavier seas to enter than if the pier was inclined towards the southeast; and a vessel entering the harbor, during a gale from the northeast, would be more liable to be thrown over to the south pier, or driven ashore; whereas, if the piers inclined to the southeast, a vessel coming in under the same circumstances would be in still water much sooner, and could be more easily managed. I am also of the opinion that there would be less danger of the accumulation of sand at the mouth of the harbor.

I think the north pier should extend from two to three hundred feet further into the lake than the south pier.

I am, very respectfully, your obedient servant,

SAMUEL HALE, *U. S. Agent.*

Colonel J. J. ABERT,
Corps Topographical Engineers.

Estimate of funds required for completing the harbor of Kenosha, (formerly Southport,) Wisconsin.

44,800 feet square timber, at 15 cents	$6,720 00
2,000 ties, 48,000 feet, at 8 cents	3,840 00
4,240 feet ties for bottoms, at 8 cents	339 20
60 kegs 8-inch spikes, at $8	480 00
6,000 pounds iron, at 5 cents	300 00
6,000 feet clamping, at $15	90 00
2,000 cords stone, at $7 25	14,500 00
Dredging 16,145 yards sand and clay, at 20 cents	3,229 00
Labor	8,000 00
	37,498 20
Contingencies, 10 per cent	3,749 82
	41,248 02

Deduct materials and cash on hand, viz:		
8,966 pounds iron, at 6 cents.....	$537 96	
Less 10 per cent. retained....	53 79	
	$484 17	
2,815 feet square timber, at 13 cents	365 95	
Balance of appropriation not yet received...	2,000 00	
Cash on hand August 31, 1853.....	7,044 20	
		$9,894 32
Amount of appropriation required to complete the harbor		31,353 70

SAMUEL HALE, *U. S. Agent.*

OFFICE OF PUBLIC WORKS,
Kenosha, September 1, 1853.

OFFICE BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, August 3, 1854.

SIR: The bureau having referred to the Board so much of the endorsement of the honorable the Secretary of War on the report, &c., of the harbor of Kenosha, Wisconsin, from this office, dated the 18th ultimo, in the following words, to wit: "Colonel Abert will report what part of the plan it is contemplated to execute with the unexpended balance on hand." I am instructed to make the following reply:

That the available funds for Kenosha, as stated in the letter of the bureau of the 19th ultimo, transmitting the report on this harbor, amount to..... $5,210 00

Which amount, the Board is of opinion, should be applied to the objects in the order following:

1. For filling in behind sheet-piling and inside of piers, from C to D and from E to F, (see drawing,) to keep the sand from washing into the channel	770 00
2. For dredging a channel 160 feet wide to a depth of 12 feet water, through the sand-bar outside of and extending across the entrance of the harbor. (See drawing.).....	317 79
3. For dredging a channel 80 feet wide to a depth of 12 feet water, (970 feet,) the entire length and between the piers.....	1,650 00
4. For building and levelling up two cribs, one on the north and the other on the south pier at the east end	613 30
5. For dredging a channel 600 feet in length and 80 feet wide, to a depth of 10 feet water, from C, at the west end of north pier, to A, to connect with the channel of the river inside. (See drawing.).....	1,858 91
Amount of available funds.....	5,210 00

On a revision of the estimate for the works at this harbor, the Board finds the aggregate stated in its report to be in excess $613 30.

It considers the error, however, of little importance, and does not propose to alter that amount, which will stand as already stated, at $24,128 78.

I have the honor to be, sir, very respectfully, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Eng., Pres't Board.

Col. J. J. ABERT,
Bureau Topographical Engineers.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, August 8, 1854.

SIR: I have the honor to submit a copy of the report of the Board of Engineers on Lake Harbors and Western Rivers, in reference to operations on the Illinois river:

The estimate of the engineer, Major G. M. Long, who made the survey, amounts to	$71,872
The estimate of the Board for the same work (under different circumstances) amounts to	21,386

Viewing these estimates as the greatest and least expression of probable cost, the mean between the two will be $46,634.

This difference in the estimates, and the reasons for it, are explained by the Board in its report. I should consider it a fortunate event if the estimate of the Board should be sustained in the execution of the work.

The appropriation for this river in the law of August, 1852, was $30,000, of which there yet remains in the treasury upwards of $17,000. If the views and estimate of the Board be correct, this amount would nearly complete the improvement contemplated by the estimates.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Colonel Corps Topographical Engineers.

Hon. JEFFERSON DAVIS,
Secretary of War.

The unexpended balance will be applied to dredging on the bars of that portion of the river which have been surveyed; the dredging will be determined by the amount which can be done throughout the distance stated, with the fund which is now available.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *August* 25, 1854.

OFFICE BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, August 1, 1854.

SIR: I am instructed by the Board to submit the following views in relation to the subject of the report of G. W. Long, esq., for the improvement of Illinois river; said report having been forwarded to the

bureau by Lieut. Col. J. E. Johnston, superintendent western river improvements, under date the 25th of July last, and by it laid before the Board.

The survey of the river appears to have been made agreeably to the instructions of Lieut. Col. Long, late superintendent western river improvements, from its mouth to the mouth of Copperas creek, about 150 miles, or 30 miles below Peoria. The Board is of opinion that the survey of the river should be extended in like manner quite to the head of navigation, at La Salle, about 100 miles above the point at which the survey was terminated.

Through the distance surveyed the width of the river, exclusive of islands, varies from 500 to 700 feet; its depth in the pools intervening between the shoals or bars varies from 4 to 12 or 14 feet, and on the bars from a few inches to 2 feet; also in the natural channels across the bars from 1 to 4 feet. Its average declivity is about $2\frac{3}{5}$ or 2.66 inches per mile. Its current is very sluggish, moving with a speed of only one quarter to one and a half miles per hour; and in consequence the bottom and sides of the channels, as well as of the river generally, are almost entirely exempt from hydraulic abrasions.

The river through the distance surveyed is everywhere free from rocks. Its bars are composed of loam, fine sand, and fresh water shells, compacted together and considerably indurated, especially on the lower portions of the river, from its mouth to the head of the extension shoals called "Naples Flats," above which the bars become less indurated and more yielding. Agreeably to an estimate of the engineer, predicated on the quantity derived from his surveys, the probable cost of dredging through the distance surveyed is as follows, viz:

From the mouth of the river to the head of Naples Flats, 65 miles, the number of bars is sixteen; and the aggregate quantity and cost of dredging are 65,975 cubic yards, and at 90 cents	$59,377 50
From Naples Flats to a point three miles above the head of Copperas creek shoals, 85 miles, there are eight bars; and the aggregate quantity and cost of dredging are 41,650 cubic yards, and at 30 cents	12,495 00
Hence the estimated cost of dredging a channel across 24 bars, and through a distance of 150 miles from the mouth of the river, amounts to	71,872 50

This estimate it is supposed has been predicated, so far as relates to cost, on results obtained from the use of the dredge-boat Gopher in a very low stage of the river. This boat was constructed on a plan adapted to the deepening of harbors, where the natural depth is three-and-a-half or four feet, and an artificial depth of ten or eleven feet is required. Hence the boat and its scows, which have the same draft, cannot operate to advantage in less than the depth of three-and-a-half or four feet upon the bars. Moreover, with this depth only, the scows could not discharge their mud, &c., for the hatches through which the discharge must be made are situated in the bottoms of the scows, and open downward; but not having space enough between the bottom of

the scow and the bed of the river, this operation could not be effected and the mud be discharged without incurring the trouble and delay of removing the scows with their contents to considerable distances, not unfrequently a mile or more, in quest of pools deep enough to receive them and to discharge their contents.

The estimate has moreover been affected by the narrowness and crookedness of the natural channels, which were to be improved by widening, straightening, and deepening. The dredge boat and scows while employed in the improvement must frequently be interrupted in their work and removed from their position, to greater or less distances, in order to make room for the steamers and other craft and rafts passing daily through the channel, whereby the work is unavoidably delayed, and its cost greatly enhanced.

Under such circumstances it is not surprising that the cost of the improvement should be estimated at even more than double what it might really cost under more favorable circumstances, which are believed to be within the reach of those to whom the direction of this improvement has been confided, and with the means now at their disposal. The work may probably be done at less than half the estimated cost above stated.

Instead of waiting for low water stages as the most favorable for carrying on the work of dredging, this work should be prosecuted during the more elevated stages, varying from two to seven feet above extreme low water. The dredge-boat and scows now in use could be employed to advantage and for much longer periods in every year by adopting this mode of operations, and the cost of improvement would no doubt be greatly reduced thereby. The operation of dredging would not be interrupted by the frequent passing of the various craft employed in the navigation of the river. The dredge-boat being adapted to operations at the depth of 10 feet below the surface of the water, would be able to open the channel to the requisite depth, viz: three feet below the surface of extreme low water during the several stages above intimated, whereby the expense of dredging might probably be reduced to 15 or 20 cents per cubic yard, instead of 30 to 90 cents, as contemplated in the estimate before recited.

In accordance with these views the estimate would stand as follows, viz:

From the mouth of the river to the head of Naples Flats, 65 miles, the number of the bars is 16, and the aggregate quantity and cost of dredging are 65,975 cubic yards, at 20 cents	$13,195 00
From Naples Flats to a point three miles above Copperas creek shoals, 85 miles, there are eight bars, and the aggregate quantity and cost of dredging, are 41,650 cubic yards, at 15 cents per yard	6,247 50
Amounting to	19,442 50
Superintendence and contingencies, 10 per cent	1,944 25
Total amount	21,386 75

Which covers the probable cost of dredging through the distance of 150 miles, from the mouth of the river upward to a point 30 miles below the town of Peoria.

Accordingly the Board recommends that the improvement of Illinois river be prosecuted with the means and appliances now in service on that river, during any or all stages of the river, varying from two to seven feet above extreme low water surface; also that the surveys be continued in accordance with the manner of conducting the same, heretofore recommended, from Copperas creek upward to head of navigation, at La Salle.

The Board would further suggest that a complete chart of the river, from La Salle to the mouth, including the island, mouths of streams, soundings of the channel, &c., &c., be prepared; also that the positions, directions, &c., of the improved channel be carefully delineated thereon, in a manner similar to that observed in preparing river guides and charts of other western rivers.

The report of G. W. Long, esq., engineer, being the only paper referred for consideration, the Board has confined itself to the expression of such opinions as that report has suggested.

Very respectfully, I have the honor to be, sir, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Eng., Pres't Board.

Col. J. J. ABERT,
Bureau Topographical Engineers.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, August 24, 1854.

SIR: I have the honor to submit a report of the Board of Engineers upon Lake Harbors and Western Rivers, in reference to Black Lake harbor, St. Joseph harbor, and Michigan city harbor, of Lake Michigan.

The report is rather advisory than as an exhibit of plans in these several cases, but inasmuch as attention to it may involve expenditures, it is submitted, and it is recommended that a copy of it be sent to Bvt. Lieut. Col. Graham, superintending engineer of harbors on Lake Michigan, with directions to respect it as far as practicable, consistently with the state of the appropriations in the several cases.

The following is a statement of the undrawn balances in the several cases referred to in the report:

Black Lake	$1,780 00
St. Joseph	1,487 00
Michigan City	7,801 00

It is respectfully recommended that in transmitting a copy of the report to Lieut. Col. Graham, his attention be called to the directions of the Hon. Secretary, as endorsed upon the report about St. Joseph on the 21st June last, in the following words:

"Where small balances, as in this case, remain unexpended, the fund had better be turned over to the office in charge of the district, for re-

pairs, and the property be so stored, or otherwise disposed of, as to relieve the government of the expense of a custodian." And which was communicated to Lieut. Col. Graham on the 22d June, but which, for the reasons given, the Board does not think applicable to Black Lake harbor.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Col. Corps Topographical Engineers.

Hon. JEFFERSON DAVIS,
Secretary of War.

I do not perceive how the direction to turn over small balances for repairs could be construed to require large balances to be withheld from the completion of works for which appropriations had been made. I will repeat that I do not approve of the commencement of any additional work with the expectation that further appropriations will be obtained to complete it, but expect that every effort will be made to close the work which is commenced, and that the plan will be such as will give the best results from the expenditure authorized.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *August* 26, 1854.

OFFICE BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, August 19, 1854.

SIR: The letter of J. R. Bowes, esq., dated the 3d instant, and referred to the Board, having been duly considered, the following report in relation to it was adopted, with instructions to communicate the same to the bureau.

That part of Mr. Bowes' letter which refers to the harbor of Black Lake is in these words: "Your communication of July 28th has been received, containing the directions of the honorable Secretary of War in relation to St. Joseph's harbor. In reply to your interrogatory: Do not the principles of these directions apply to Black Lake harbor? I think they do not for various reasons: The first is, that the work is in an incomplete state, and if left in its present condition would be perfectly useless, the pier requiring a further extension into deeper water, which was intended to have been done during the present season, if instructions had been received for resuming active operations."

"In addition to the unexpended balances now in the treasury belonging to this work, there is a quantity of piles, timber, and other materials, nearly sufficient to construct an extension of the pier to a depth of water that will allow vessels to receive and discharge their cargoes from it, and thereby make it available for use, either to the United States or the local commerce. I would, therefore, advise and urge for the consideration of the department, that the balance remaining on

hand be applied to giving the bridge pier the intended (say 200 feet) extension. By this means it will be of essential benefit to the commerce of the place, and also in the future construction as a means of receiving the materials, stone, &c. I cannot close this communication without observing, that by leaving the pier in its present unfinished condition it will disappoint the sanguine expectation of a numerous and growing community, who are now large exporters, and who are looking to the extension of this pier with great interest, and have depended upon it as an important measure that will greatly aid their commercial business, until the final completion of the improvement of their harbor."

Upon this the Board has very respectfully to say, that the plan of improvement and the order of its execution, as presented by Mr. Bowes, was favorably reported upon by the Board, under date the 9th of May, 1853, that this report received the approval of the bureau, and that the present proposition of the agent is but to carry out a measure that has been already sactioned by the War Department to the extent of the means at its disposal. The Board has, therefore, respectfully to recommend, that the agent's views in this matter be carried out, the Board being of opinion that the reasons in favor of the proposed course are sufficient.

As to the portion of the agent's letter which treats of the harbor of St. Joseph's, the Board is of opinion that the unexpended balance of the appropriation for that place should be applied to the immediate repair of the damaged portion of the northern pier lying in connexion with the shore, which the agent represents as being very dangerously exposed, and likely to be breached if not soon attended to—a catastrophe which could not but very seriously injure the entrance.

Respecting the works intended for the harbor of Michigan city, the Board has nothing to add to the reports heretofore made by it. As to the agent's proposition to repair the dilapidated piers at the mouth of Trail creek, where the city of Michigan is situated, the Board does not now find sufficient reasons to justify a compliance with his suggestion, unless the piers when repaired may be profitably used in the execution of the plan heretofore proposed by the Board for the harbor.

With reference to the remaining topic of Mr. Bowes' letter, namely, the harbor of New Buffalo, the Board has very respectfully to say, that the plan which it proposes to recommend for its improvement has been matured, and that the report upon it is in the hands of the copyist.

Respectfully, I have the honor to be, sir, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Engineers, Pres't Board.

Col. J. J. ABERT,
Bureau Top. Engineers.

OFFICE BOARD OF ENGINEERS
LAKE HARBORS AND WESTERN RIVERS,
Washington, September 1, 1854.

SIR: I am instructed by the Board to submit the following report, in reference to the improvement of the Tennessee river, and to the Ohio, including Cumberland dam, as required by your letter of the 10th ultimo.

In regard to the improvement of the western rivers generally, the Board is of opinion that the entire and ultimate cost of improving any one of them for which appropriations have heretofore been made cannot be ascertained with any degree of precision. From the nature of the rivers and of their obstructions, all improvements must be progressive, and continue through indefinite periods of time; with the exception of certain individual localities, where the obstructions are of a permanent character, approximate estimates, based on adequate instrumental surveys, may be made. These exceptions may be applied in certain cases, for example: the rapids of the upper Mississippi, the falls of the Ohio, Colbert's and the Muscle shoals of the Tennessee, the Suck Pot, Tumbling shoals, and numerous other difficult passes in the river last mentioned, together with the Big and Little Chains, Le Tart's falls, Cumberland dam, &c., &c., on the Ohio river, which are among the more prominent exceptions.

The sand bars, rafts, snags, logs, stumps, impending trees, &c., on other portions of the rivers are too liable to changes and to new accumulations to admit any reliable computations with respect to their ultimate cost of removal.

Improvement of the Tennessee river.

The appropriation for this river, made and approved under date of August 30, 1852, was $50,000, the expenditure of which was limited to that portion of the river situated between Knoxville and Kelley's ferry, about two hundred miles below.

The expenditure of this appropriation confided to Brevet Lieutenant Colonel John McClellan, corps Topographical Engineers, agreeably to whose reports and returns the whole of the appropriation has been drawn from the treasury, and no doubt expended on the improvement prior to this date.

The objects upon which the expenditures have been made, and the sums required to complete these objects have been reported by Colonel McClellan, under date of September 1, 1853.

In accordance with this and subsequent returns it appears that, at the close of the second quarter of 1854, the amount expended for work done was $39,888 35, leaving an unexpended balance of $10,111 65, which appears from his returns to have been applied towards the completion of sundry works in progress, subsequently to the 30th of June last.

Agreeably to the reports of Colonel McClellan, the several localities operated upon, and numerous others at which improvements have not been commenced, were duly surveyed, all of which are situated in the river, between Knoxville and the Tumbling shoals, inclusive—the num-

ber of localities at which improvements are required being forty-five, and the number surveyed being forty-two—in the distance as before mentioned of about two hundred miles.

Colonel McClellan estimates the aggregate cost of improving the Holston and Tenessee rivers, between Knoxville and Kelley's ferry, in the manner proposed in his report of September 1, 1853, at.....	$125,425 02
From this amount should be deducted the appropriation of August, 1852, viz.....	50,000 00
And we have for the amount required to complete the improvements in the manner proposed by Colonel McClellan on this portion of the river.....	75,425 02

The Board is impressed with the belief that the amount thus estimated will fall far short of effecting the objects in view, which, as they understand them, contemplate the opening of a low water channel of the requisite width, and at least two feet deep, through the distance above mentioned.

The Board, moreover, questions the propriety of adopting the method of improvement proposed by Colonel McClellan in order to facilitate the passage of steamers, &c., through the very difficult pass called the Suck.

His plan of improving this formidable pass contemplates the reduction of the surface level of the pool immediately above the Suck, nearly to that of the river immediately below it (the difference in their levels being four feet four and a half inches, in a distance of 1,940 feet) by excavating a channel 330 feet wide (depth not stated) from the head to the foot of the pass.

The Board deems this mode of improvement objectionable, for the reason that an obstruction quite as formidable as the Suck would be produced at the distance of a quarter of a mile only above the Suck, where a shoal now exists, in the event that the surface of the eddy at the head of the Suck is reduced to the level proposed by Colonel McClellan.

In the absence of charts and diagrams exhibiting, in plans, profiles, sections, and soundings, the nature, extent, and character of the several localities at which improvements are required, and of the structures or methods of improvements proposed to be adopted, the Board is not prepared to approve or prescribe any plans of improvement for the localities in question.

Under this head the Board would moreover observe that the Tennessee river, below the Muscle shoals, especially at the rapids at and below Colbert's shoals, has strong claims to consideration in future appropriations for the improvement of the western rivers; also that the opening of a channel for sluice navigation from the head to the foot of the Muscle shoals is at the same time worthy of particular attention. The extent of this rapid is about thirty-six miles, and its aggregate fall about one hundred feet, giving for its average descent a little less than

three feet per mile, a declivity which may be surmounted by steamers of ordinary power and speed.

No estimate can be given of the probable cost of improving either of these important passes till careful and minute surveys, and illustrations of the same in plans and sections, shall have been made.

The improvement of the Ohio, including Cumberland dam.

The appropriation for this improvement, made and approved under the same date, viz: August 30, 1852, was $90,000, the expenditure of which was applicable to the improvements above mentioned.

In February, 1853, C. A. Fuller, esq., was appointed United States agent for carrying on the operations provided for under this appropriation. Agreeably to the reports and returns of this agent, the amount expended up to the close of the second quarter of 1854 is $85,314 75.

This amount includes large expenditures incurred on account of the construction and equipment of the dredge-boat Gopher, and also on the same accounts in part incurred for the light draft snag-boat Terror, which has been employed for the most part in removing obstructions from the Ohio river, while the dredge-boat was employed on the same river till an early date in November last, when it was transferred to the Illinois, for service on this river.

The balance remaining unexpended on the 1st of July last, viz: $4,685 25, is no doubt expended, or nearly so, by this time, and will probably be accounted for by the agent at the close of the current quarter.

Of the numerous localities on the Ohio river at which improvements are needed, and for which specific methods of improvement may be devised, and their respective ultimate costs be proximately defined, the agent, C. A. Fuller, esq., has reported no less than thirty-two between Pittsburg and Louisville, omitting at this time any remarks on the subject of improving the falls at Louisville, numerous obstructions in the way of low water navigation, and in the form of ever-varying sand bars are to be met with in the Ohio below the falls, together with the rocky bars called the Grand and Little Chains, nineteen to thirty miles above the mouth of the river, and Cumberland dam, near the mouth of Cumberland river, the last three of which, and perhaps others of similar characters, are susceptible of definite plans of improvement.

At several of the localities alluded to, viz: at Deer island, Nevil's island, Brown's island, Mingo island, Twin islands, Captina island, Fish Creek island, Fishing Creek island, Williamson's island, Mills' island, Blannerhassett's island, and Buffington's island, the agent has given, in a summary manner, the quantity of stone supposed to be requisite to the completion of the improvement at each of the several points mentioned, which, in the aggregate, amounts to about 30,000 perches, at prices varying from $1 40 to $1 50 per perch. But as the estimates are in no case accompanied by drawings of the localities of the methods of improvement proposed to be adopted, the Board hesitates to pronounce upon their sufficiency for the purposes in view.

In regard to the dredging required in the channel at the lower end of Cumberland island, it may be observed that the operation can be

more readily and effectually performed in a stage of the river some four to six feet above extreme low water than at the low water stage; also that the dredge-boat now at Dubuque may, with propriety, be transferred to the Ohio for service at this and other points thereon in the event of another appropriation for the improvement of the Ohio.

The localities above considered, although prominent on account of the obstructions existing thereat, embrace comparatively but few of the points at which improvements are needed on the Ohio. The points not enumerated are mostly positions at which the low water channels are obstructed by shifting sand bars, and where channels must be formed on the subsidence of every considerable flood by dredging or otherwise. The method of improving these localities by the erection of jettys, wing dams, &c., of stone or other materials, is very questionable, in view of the benefits that have hitherto resulted from works of the sort heretofore constructed. Of the numerous instances in which wing dams, &c., have been built for the purpose of opening and maintaining a navigable low water channel across the sand bars of the Ohio, there are but very few examples of these having produced any good effect, and very many where they have done more harm than good. The Board is therefore of the opinion, that in almost every case where channels are to be found across shifting sand bars, the surest and most economical method of improvement consists in the use of properly constructed steam dredges, to be employed on the subsidence of every considerable freshet, and prior to the occurrence of ordinary low water.

As before intimated, however, the Board cannot decide upon the manner of improvement applicable to any of the localities alluded to, without explanatory plans and other drawings, based upon instrumental surveys, soundings, &c., of the several localities in question.

Finally, the Board is decidedly of the opinion that no reliable estimate, covering the entire amount requisite for the completion of any of the systems of improvements, either of the Ohio or of the Tennessee river, or indeed of any other of the western rivers, can be given, especially in so far as relates to the formation of navigable channels across sand bars, and to the removal of rafts, snags, logs, &c., from the navigable channels of all those rivers.

I have the honor to be, sir, very respectfully, your obedient servant.

JAMES KEARNEY,
Lieut. Col. Top. Engineers, Prest Board.

Col. J. J. ABERT,
Bureau Top. Engineers.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, September 6, 1854.

SIR: I submit the views of the Board of Engineers on Lake Harbors and Western Rivers, (this day received,) in reference to the Red river.

I had the honor of receiving the copy of your letter to Mr. T. B. Gilmer, of the 18th instant, in which it is said, "a more thorough survey will be required, and will be made, to determine the best manner of directing the work."

At the time this letter was received at this office, (21st,) the subject of improving the Red river was before the Board, and in order to make known to the Board the views of the War Department, the copy of your letter, and the letter of Mr. Gilmer, were placed in the hands of the president of the Board.

As the most recent examination of the Red river under this office was in 1841, it appears to me that any plan about the Red river is rather premature before the authorized survey be made, because any judicious plan should be consequent upon, or in harmony with, the facts which that survey shall develope, therefore, (for this and other reasons,) I cannot recommend to the approval of the Secretary any more of the views of the Board than those which relate to the required investigation and survey, for which the Board has made an estimate of probable expenditure for the first year of $3,200. But the whole work of this character will cost more.

After the desired investigation and survey have been made, the Board can digest a plan for the work, which, if approved, can be transmitted for execution to such officer or agent as the honorable Secretary shall designate.

I find an impression to exist, on conferring with the Board, that the appropriation for the Red river will have to be either expended or to be drawn out of the treasury by the 30th of next June, or it will then be liable (according to law) to be carried to the surplus fund, which is also the opinion of the comptroller.

Under these circumstances the amount, if not expended before the 30th of next June, or any unexpended balance in the treasury at that time, will belong to the surplus fund, or will have previously to be drawn out of the treasury, or the time of expenditure will have to be extended by some timely enactment by Congress.

It may be proper to remark, that in conversation with Mr. Gilmer, he said it would not be safe to send any one in that region for the required survey before about the middle of October.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Col. Corps Top. Engineers.

Hon. JEFFERSON DAVIS,
Secretary of War.

Lieutenant Colonel Johnston, in charge of the western river improvements, will be directed to make the necessary examinations of the raft and its vicinity, and will be furnished with a copy of the within report. The suggestion of the Board as to the most prompt and energetic proceeding is fully concurred in, but the preliminary examination proposed is deemed necessary to secure economy and success.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT,
September 14, 1854.

OFFICE OF BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, August 22, 1854.

SIR: In accordance with your directions of the 10th instant, I am instructed by the Board to submit the following report in reference to the removal of the raft of Red river.

In 1841, since which time no material changes appear to have taken place in the character of the river, or in the nature of its obstructions, the Red river through the raft region was examined with much care by an officer, now a member of this Board, who subsequently prepared and submitted a report, setting forth the condition of the river and region, the character and regimen of the river, the character, extent, and position of the raft, and other impediments in the way of its navigation, and the methods heretofore adopted, and those deemed proper and advisable, for the purpose of removing the raft and other obstructions at the time of his investigations.

The methods of improvement recommended in his report were of the following import, viz:

PROPOSITION 1. It is proposed, in the first place, to remove the present raft situated in the main channel of the river, and extending downward five or six miles, the same being composed of a series of detached portions, having an aggregate extent of about three miles, together with the additions that may be made to the same prior to the date of removal.

The process by which the removal is proposed to be effected is explained in the following manner: During a period of low water, and at the earliest practicable date, the trees, logs, and other timber composing the raft, should be reduced by sawing, or otherwise, to pieces not more than thirty feet long, and no piece with its stump and roots attached should exceed ten feet in length.

Prior to the cutting of the raft in manner just mentioned, or subsequently to that operation, and during the dryer portions of the year, the inflammable materials of the raft should be consumed by fire.

At the commencement of an autumnal freshet, and during the prevalence of high water, a snag boat should be sent to the site of the raft, and employed in removing the same, by loosening and dragging out the materials of which it is composed, and by eradicating, raising, and conveying from the channel all snags, planters, stumps, &c., whether connected with the raft, or situated in neighboring portions of the river channel.

All materials loosened and removed as above contemplated, should be conveyed away and deposited in such places and in such manner as will prevent them from becoming or occasioning any new obstructions elsewhere in the river.

PROPOSITION 2. All rafts, planters, sawyers, snags, stumps, logs, &c., that may now or hereafter exist in the main navigable channel between the outlet into Red bayou, near the northern boundary of Louisiana, and the confluence of the main navigable river, with Bayou Pierre, six miles above Grand Ecore, which embraces the entire district in which the old rafts were situated, should be removed and deposited in such

manner as will leave the main improved channel entirely free of obstructions of this nature. These operations should be carried into effect and continued annually through an indefinite series of years, with the use of a suitable snag boat and other suitable craft.

PROPOSITION 3. All willow points or bars protruding into the channel and occasioning short and abrupt bends into the same, by reason of which, and the narrowness of the channel, steamers in passing them are liable to be driven against the shores opposite to such points, should be reduced, by removing the earth, sand, &c., from such points and forcibly extracting therefrom the logs, stumps, roots, &c., by means of which the points are bonded and held together, and enabled to withstand the river currents.

PROPOSITION 4. Cuts off should be formed at the gorges of bends or detours of the main river channel, wherever an acceleration of the current is deemed useful, in order to prevent the depositions of alluvion in the channel; to guard against overflows and extravasations of water from the same; to diminish the length of the navigable channel; to promote the abrasions of its sides, and contribute to its enlargement, &c., &c.

PROPOSITION 5. Trees growing on the concave shores of the main channel, and to the distance of their greatest length therefrom, should be felled and cut into lengths not exceeding twenty or thirty feet, in order to prevent their falling into the channel and becoming obstructions to its navigation. This operation should be carried into effect not only upon all parts of the main stream included within the raft region, but generally on those parts situated above it, to an indefinite extent.

Any other operations having for their object the improvement of the river navigation, and deemed proper and advisable by the superintending engineer, or others charged with the direction of the work, should also be carried into effect.

At the instance and earnest recommendations of numerous citizens of the Red river country, as set forth in a memorial of a committee appointed for the purpose, the operations contemplated in the foregoing propositions were attempted to be carried into effect under a specific contract, which was concluded at Washington under date of September 6, 1841. The superintendence of the work contracted for was confided to the late Brevet Major T. B. Linnard, Topographical Engineers, and prosecuted by the contractor with questionable energy and doubtful success, till March 6, 1844, when the superintending engineer (Major Linnard) "declared the contract void," instead of admitting its abandonment as intended, agreeably to a previous notice from the contractor, dated about the close of the preceding January.

The terms of the contract and the progress made towards its fulfilment, or the expenditures incurred on account thereof, need not be recited on this occasion, nor is it deemed advisable by the Board to carry into effect any similar provisions by means of any contract whatever.

To the foregoing propositions an additional expedient is deemed by the Board proper and advisable, which is of the following import:

PROPOSITION 6. The portions or components of the rafts, reduced in the manner contemplated in the preceding propositions should be conveyed downward to the nearest outlet bayou, and floated into

the same, and then disposed of in a manner to block up the outlet channel. The outlet flow of water, being thus partially obstructed, may be effectually intercepted by one or more rows of piles driven across the head of the bayou, after the fragments of the raft shall have been deposited therein.

With respect to the means and appliances proper to be employed in removal of the raft, the Board takes leave to suggest the following, viz:

First. The light draught twin snag-boat, constructed for the improvement of the western rivers in 1853, which, in order to render it properly adapted to this service, will need certain alterations and additions of the following description, viz:

1. The substitution of four new boilers, eighteen feet long, instead of the two boilers of greater length now attached to the boat.

2. The position of the fire-places should be changed from the front to the back ends of the boilers.

3. A reduction of about fifteen inches in the height of the furnace frames.

4. The removal of all the deck rollers, except the forward and aft rollers, and the substitution of an inclined platform or deck in their stead, on which the raised logs may more readily and conveniently be cut and slid over the stern roller.

5. The bows of the boat should be fortified by a sheathing of plank of the same thickness as the present bottom.

6. Sundry other modifications of less moment will suggest themselves in the progress of executing those above proposed.

It is believed that all the alterations and amendments above prescribed may be effected at an aggregate cost not exceeding five thousand dollars, ($5,000.)

Second. Two twin machine boats, with such attachments as have been heretofore deemed appropriate as equipments for such craft. The probable cost of each boat, with its equipments complete, may be estimated at $2,500 ..... $5,000 00

Two yawls, with oars complete, at $100	200 00
Two skiffs, with oars complete, at $25	50 00
One pile driver, including a ram weighing 1,500 pounds, fitted for use on board of one of the machine boats	500 00
Amount required for the above craft and equipment ..	5,750 00

Third. Probable expense per month of working the craft above designated:

Expenses per month of working the snag-boat, all things included	$2,500 00
Expenses of working two hand-machine boats, all things included	500 00
Superintendence and contingencies per month, say	300 00
Aggregate cost per month	3,300 00

Annual expense of furnishing and working said craft, estimated at six working months per year	$19,800	00
Annual expense of custody and safe-keeping of said craft, &c., during the remaining six months of the year at $150 per month	900	00
Repairs and removals of said craft, including deteriorations, losses, &c., for one year, estimated at about one-fifth of the prime cost of the craft, say	6,100	00
Estimated annual expense, say for the current fiscal year	26,300	00
To this amount should be added the probable cost of examinations, surveys, &c., for the current fiscal year, say	3,200	00
Amount for current fiscal year	30,000	00
This amount deducted from the existing appropriation, viz., $100,000, leaves, for the ensuing fiscal year, this sum, viz	$60,000	00

In conclusion, the Board takes leave to recommend that, with the means and appliances above proposed, the work of removing the existing raft at and in the neighborhood of Phelps's landing (so called) be commenced as early as practicable, and prosecuted with diligence till the obstructions are effectually removed from the main navigable channel of the river, and a free passage for steamers be opened from that point downward to the mouth of the river. Also, and in the meantime, that a thorough reconnaissance or examination, with such instrumental surveys as may from time to time be found needful, be made on other parts of the river, including bayous, lakes, &c., with a view to ascertain the feasibility of other navigable channels leading upward through the Bayou Pierre to Shreveport, and thence upward through Cross lake, Soda lake, Red bayou, &c., to a suitable point on the river above the head of the present raft.

In view of the character and condition of the raft region, which embraces a length of about eighty-four miles and a width varying from five to twelve miles, or an area of about seven hundred and fourteen square miles, through which the waters of Red river flow in a multiplicity of meandering channels, and through numerous bayous, lagoons, lakes, &c., all abounding in outlets and inlets, through the former of which the water of the main channel is more or less exhausted, to the injury of the navigation, and through the latter is again restored to the main channel—in the former case the facilities of the navigation being impaired at various points, while in the latter they are again restored on other portions of the river; in view of all which the proposed examination, accompanied by instrumental surveys and soundings at particular points, for determining the width, depth, &c., of the channels, and of the volumes and velocities of the water passing them, seems highly expedient and proper. At certain points in the existing navigable channel, owing to the exhaustions above adverted to, the channel currents are reduced almost to stagnation, while in a few intances these currents are completely reversed in certain stages and

conditions of the river, giving occasion in both instances to the blocking up of this channel, by sedimentary deposites, and to the formation of bars impassable in a low stage of the river.

The leading objects of the examination and surveys should be the discovery of the most favorable positions and directions through which the water, especially in a low stage, may be made to flow, with a current as nearly equable as possible, through the entire raft region; also, of the localities through which, and the means by which, a permanent navigable channel may be found, and kept open and free from obstructions, through the entire raft region, commencing at the mouth of Bayou Pierre, near Grand Ecore, and extending upward to the head of Red bayou, twenty or thirty miles above the head of the present raft.

The Board takes leave to add, by way of postscript, that since the preparation of the preceding part of this report, the copy of a letter from the honorable Secretary of War to James B. Gilmer, esq., dated on the 15th instant, has been referred to its consideration. This letter relates to the removal of the raft, and contains the following remark, viz: "A more thorough survey will be required and will be made to determine the best manner of executing the work."

In reference to this subject, the Board takes leave respectfully to observe, that the want of the means and appliances, contemplated in the foregoing report, exclusive of funds, and the present low stage of the river, which is likely to continue till the occurrence of the usual autumnal freshets, which are expected to take place in the month of October, are the only impediments in the way of immediate operations for the removal of the existing raft; also that the river is at a stage too low to admit of the requisite examinations and surveys deemed needful in order to determine the most favorable passes through which, and the system of improvement by which the most permanent and efficacious channel for navigation can be found.

The Board would accordingly suggest that the course most proper to be pursued in reference to these and other objects, is the same as that proposed and recommended in the foregoing report, viz: that the removal of the raft and the execution of the examinations and survey be undertaken simultaneously, and prosecuted with energy and dispatch, till their final and satisfactory completion.

This course is deemed worthy of special consideration for the reason that the present exigencies of the river commerce are exceedingly pressing, and call for the removal of the raft as early as practicable; also that the inadequacy of the existing appropriation ($100,000) for the double purpose of executing the surveys and of opening any new channel, other than that obstructed by the present raft, is manifest.

I have the honor to be, very respectfully, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Eng., Pres't Board.

Col. J. J. ABERT,
Bureau Topographical Engineers.

OFFICE BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, September 1, 1854.

SIR: The letter of Brevet Lieutenant Colonel Graham, general superintendent of harbors of Lake Michigan, of the 19th ultimo, having on the 31st been referred to the Board with the following endorsement of the bureau, to wit: "Respectfully referred to Board of Engineers, which will please state objections to any part, or if modifications proposed will require any additional expenditures to those approved plans," I am instructed to make the following report thereon:

Under the head of Manitowoc, Lieutenant Colonel Graham says: "I would recommend that I be authorized to increase the width between the piers there, from 200 feet, the width now prescribed, to 240 feet. The ground will be readily relinquished for that object, and I feel satisfied that the force of the current during the spring freshets would as effectually open the channel if of that width, and it would much increase the facilities for entering the harbor."

On this point the Board has to remark that as the distance of 200 feet between the piers for this harbor, was not adopted from precise information of the volume of water thrown out by the river, but on the recommendation of the then general superintendent, and in consideration of the width in question being frequently adopted and found advantageous for lake harbors, it has no hesitation in recommending, in case the necessary land shall be relinquished, and further investigation confirm the opinion that the force of the current of spring freshets will be effectual in opening a channel of 240 feet, that authority be given to adopt that width; with the condition, however, that the entrance between the piers be made to conform to the direction of the south bank of the river above, by giving the south pier a position on a line parallel to the present designed line, at the required distance.

In that part of the letter which refers to Sheboygan, Lieut. Col. Graham holds the following language: "For want of sheath-piling on the exposed faces of the terminating cribs of the two piers, they have both dipped to the northeast from being undermined by the lake current. This has twisted and ruptured some of the timbers, but the necessary repairs can be conveniently made as the damage is chiefly above the water surface."

It is inferred from the accompanying estimate for this work, for it is not expressly recommended, that Lieutenant Colonel Graham proposes to apply sheet-piling to the outer ends of the piers in question. This course the Board approves, but takes occasion, at the same time, to remark that the tilting of the pier is not, in its opinion, due to the absence of this piling, but to the construction of the cribs with tight bottoms, which does not allow the ballast-stone to fall on the bottom or bed of the lake, and thus compensate for any sand that may be carried away either by the currents or the waves.

At Kenosha, Lieutenant Colonel Graham recommends: 1. Sheet-piling the outer cribs, and one or two places of the piers. 2. Completing the sheet-piling from the west end of the north pier to the shore

in the river. 3. Surveying the harbor. And 4. Dredging the harbor to 12 feet. He also provides in his estimate for the pay of the agent, and the hire of an office, &c. The Board in the report of 3d ultimo designated, by direction of the honorable the Secretary of War, the objects under the general plan for this harbor, dated the 18th July last, which, in its opinion, should be carried out with the balance on hand. These objects were: 1. To fill in behind the sheet-piling and piers. 2. To build up the outer crib of each pier. And 3. To dredge from deep water in the lake to 12 feet in the harbor.

The only measure positively common to both recommendations is that for dredging. The cost of this operation is stated by the Board at $3,826 70, and by Lieut. Col. Graham at $1,000, or less than the first by $2,826 70, which sum, in the opinion of the Board, may very profitably be applied in case the requisite depth into the harbor can be obtained for the lesser price named, in constructing the proposed sheet piling, the cost of which is set down at $2,690 70, more especially as it will suffice, considering the necessity for filling in behind the present sheet-piling and the piers will thus be obviated. To carry out the remaining measure of building up the outer crib of each pier ($613 30,) and pay the agent, ($360,) and hire an office, &c., (260 34,) and besides leave a balance of $285 66 for the survey, the expense of which, considering the very limited means at disposal, and the urgency of the required construction and repairs, should for the present be limited to that sum.

In reference to that part of the letter under the head of the same harbor, which relates to dredging in the mouth of the river, now connected by the channel between the piers with the lake, the Board has only to remark, that fully admitting the value of an increased capacity for the harbor, it cannot, under the rule of long established usage in like cases, approve of the measure so far as its execution depends upon the government.

The proposition of Lieut. Col. Graham to repair the piers at Chicago above the water level with oak timber, meets the approval of the Board for that portion of each which lies beyond the protection given by the accumulation as lake drift. It will be time enough, in the opinion of the Board, on the completion of these repairs, to consider the propriety of extending them throughout.

The letter of Lieut. Col. Graham is returned.

I have the honor to be, very respectfully, your obedient servant,

JAMES KEARNEY,

Lieut. Col. Top. Eng., President of Board.

Col. J. J. ABERT, *Bureau Top. Eng.*

BUREAU OF TOPOGRAPHICAL ENGINEERS,

Washington, September 6, 1854.

SIR: I have the honor to submit the plan and estimate of the Board of Engineers on Lake Harbors and Western Rivers, received this day, to the consideration and decision of the War Department.

The recommendations of the Board are that the first work to be done is that of improving the Des Moines rapids.

The estimate of the Board for the work it recommends on these rapids is $54,336.

The balance of the appropriation, after the foregoing work shall have been completed, it is recommended by the Board, should be expended on Lamalles Chain, a part of the lower or Des Moines rapids. With the views of the Board on these subjects the undersigned fully concurs.

It will be seen that the course recommended by the Board contemplates that the greater part of the appropriation in reference to these rapids, namely, the Des Moines rapids and the Rock Island rapids of the Mississippi, be expended on the Des Moines rapids as the most efficient mode of disposing of the unexpended balance of the appropriation.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Col. Corps Top. Engineers.

Hon. JEFFERSON DAVIS,
Secretary of War.

Recommendation of the Board approved as to the amount to be expended on the Lower and English Chains. The remainder of the balances on hand must be expended on the Rock River rapids; no part of the appropriation being, by its terms, applicable to Lamallas Chain.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *September* 14, 1854.

OFFICE BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, August 26, 1854.

SIR: The Board having duly considered the letter of the bureau of the 10th instant, I am instructed to submit the following report upon that part of it which relates to the rapids of the Mississippi.

On a former occasion the attention of the Board was directed to this subject, and a report thereon was submitted under date of February 23, 1853.

For want of the requisite details of the surveys that had been made previously to that date, and in the absence of any plans, sections, &c., indicating with the requisite provision the true character and condition of the channel to be improved, except in so far as relates to a general chart of Des Moines and Rock Island rapids, respectively, on a scale too small to indicate the nature and extent of the obstructions contemplated to be removed, the Board was constrained to supply numerous deficiencies by assumptions instead of accurate data, and to present its opinions in regard to the quantity and cost of the work required on premises of a character somewhat questionable. Accordingly, they assumed equal quantities of rock excavation for both of the rapids above mentioned, viz., 100,000 cubic yards for each, and equal prices per cubic yard, viz., $2 50, including all expenses incident to the execution of the work on each of the rapids, and giving for the aggregate quantity and cost of improving both rapids 200,000 cubic yards at $2 50—$500,000.

In a subsequent report of the Board, submitted under date of February 7, 1854, on the amounts required for the completion of the improvement of both rapids, is the following remark, viz:

"The estimated cost of completing these works (viz., in the aggregate $464,000) is founded on the reports of Captain Lee, Corps of Engineers, dated December 6, 1837. Recently a more minute examination of the ground and the consideration of the enhanced prices of labor and materials led to the opinion that the ultimate cost of these works will greatly exceed the amount stated. These remarks apply to the Rock Island and Des Moines rapids improvements, the estimates for which are about to be revised."

The examination alluded to in the foregoing extract has been made, and a report thereon has been rendered by Lieutenant G. K. Warren, under date of the 6th of April last, who was charged with the surveys and investigations deemed necessary to a full and clear understanding of the localities, nature, and extent of the work required to be done, in order to effect the desired improvement of both of the rapids.

The probable cost of the work, as reported by Lieutenant now Colonel Lee in 1837, and by Lieutenant Warren in 1854, differ materially. The Board are not, however, sufficiently informed as to the nature of the work and of the circumstances under which it must be performed to give a decided opinion upon this point. They feel constrained, therefore, to exhibit the estimates of those two officers, and to adopt a mean between them for the cost, as the nearest approximation to the actual cost, at which they are now able to arrive.

In Colonel Lee's estimate of December 6, 1837, as based on surveys and examinations made under his direction, and with the view of opening a continued low water channel 200 feet wide and 5 *feet deep* throughout, are embraced the following summary items, viz:

Excavation of the entire channel from the head to the foot of the Des Moines rapids 11,005 miles, 94,811 cubic yards, at $2	$189,622 00
Excavation of the entire channel from the head to the foot of Rock Island rapids 14 miles, 77,329 cubic yards, at $2	154,658 00
Total for both rapids 172,140 cubic yards	344,280 00

In Lieutenant Warren's estimate of April 6, 1854, as based on surveys and examinations made by him with a view to the formation of a continued low water channel 200 feet wide and 4 *feet deep* throughout, are embraced the following summary items, viz:

Excavations of the entire channel from the head to the foot of the Des Moines rapids 10½ miles, 89,353 cubic yards, at $10 per cubic yard	$893,530 00
Excavation of the entire channel from the head to the foot of Rock Island rapids 13 miles, 45,015 cubic yards, at $10 per cubic yard	450,150 00
Total for both rapids 134,368 cubic yards at $10	1,343,680 00

It should be observed that the difference between the quantities of excavation estimated by Colonel Lee and Lieutenant Warren, respectively, may be accounted for in part by the fact that about 2,000 cubic yards of stone were removed from the Des Moines rapids, under the direction of Colonel Lee, subsequently to the date of his report of 1837, and more especially by the difference in the depths of the channels contemplated in the estimates of those officers—that of Colonel Lee being five feet, and that of Lieutenant Warren being only four feet. Moreover, the price in the estimate of Colonel Lee is only $2 per cubic yard, no allowance being made for superintendence and contingencies; whereas the estimates of Lieutenant Warren provides for a cost of $10 per cubic yard, which is intended no doubt to cover all expenditures incurred on account of the improvements, except perhaps charge for superintendence.

They would further take leave to remark, that a mean between the prices per cubic yard, as estimated by Colonel Lee and Lieutenant Warren, viz., $6, accords very nearly with the price stipulated to be paid, viz., $5 85, for the improvement of both rapids under contracts made in February last.

By taking the quantity of excavation as reported by Lieut. Warren, and the mean of the prices as estimated by Col. Lee and Lieut. Warren, viz., $6, the estimate will stand as follows, viz:

For the Des Moines rapids, 89,353 cubic yards, at $6 per cubic yard	$536,118 00
For the Rock Island rapids, 45,015 cubic yards, at $6 per cubic yard	270,090 00
Total for both rapids, 134,368 cub. yds. at $6 per cub. yd.	806,208 00

Agreeably to returns made to the Bureau of Topographical Engineers, it appears that of the appropriation made for the improvement of the rapids of the Mississippi in August, 1853, viz., $10,000, a balance of $90,263 remains unexpended. The Board is of opinion that the expenditure of this balance should be confined to the improvement of the rapids at the "lower chain and English chain" of the Des Moines rapids. The estimated quantity of rock to be blasted and removed on these two chains, and the probable cost thereof, are as follows, viz:

For the lower chain, 4,813 cubic yards, at $6	$28,878 00
For the English chain, 4,243 cubic yards, at $6	25,458 00
Amount for both chains, 9,056 cubic yards, at $6	54,336 00

This amount deducted from the balance above stated, viz., $90,263, will leave for superintendence and contingency, and for operation on other portions of the Des Moines rapids, $35,927, which may be expended with convenience and to advantage in the partial improvement of Lamallas chain, which is the next above the English chain.

The reasons of the opinion of the Board, as above signified, are briefly as follows, viz:

1st. The improvement of the Des Moines rapids, and of the Rock Island rapids, are provided for by separate contracts, and may with propriety, and with far greater convenience to the contractor, and with equal benefit to the public, be carried on separately.

2d. The improvement of the Des Moines rapids, commencing at their foot and proceeding upward, is likely to subserve the public interests more effectually than a very partial improvement on both rapids.

3d. The distance from the Des Moines to Rock Island rapids is about 140 miles, which will render it necessary that two distinct sets of apparatus, each including all varieties of water craft, machinery, tools, &c., in order to prosecute the improvement of both rapids at the same time. In view of the limited means now applicable to these branches of the service, compared with the amount of the estimated cost of improving both rapids, it would seem onerous, if not ruinous, to compel the contractor to carry on both improvements simultaneously.

4th. The expenditure of the entire balance ($90,263) on the improvement of the Des Moines rapids, would not be likely to produce greater facilities for the navigation of these rapids than those now existing on the Rock Island rapids, without any additional improvements.

In conclusion, the Board takes leave to observe in reference to the sufficiency of the river, in its lowest stage, to fill a channel 200 feet wide and 4 feet deep, in which the current may in the same stage have a velocity of five miles per hour. Lieut. Warren has informed the Board that, in accordance with estimates from observations made by him at sundry points in a very low stage, the entire volume of the river passing both rapids is sufficient to fill a channel 600 feet wide and 4 feet deep, with a current of six miles per hour, as signified by the following statement in his own words, viz: "I have no hesitation in saying that the amount of water passing at the lowest stage is capable of maintaining a velocity of six miles per hour in a channel four feet deep and 600 feet wide, the quantity required to accomplish this being 21,120 cubic feet per second.

I have the honor to be, sir, very respectfully, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Eng., Pres. Board.

Col. J. J. ABERT,
Bureau of Topographical Engineers.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, September 2, 1854.

SIR: I have the honor to submit the final report of the Board of Engineers, (received this day,) in reference to the harbor of New Buffalo, State of Michigan.

This may with propriety be considered as a new harbor, as previously to the appropriation in the law of August, 1852, nothing had been expended by the United States in reference to this harbor, except

for the making of surveys. The Board has therefore presented, what may with propriety be called, in reference to this harbor, an original plan.

The appropriation for this harbor, in the law of August, 1852, was $8,000, of which there now remains in the treasury an unexpended balance of $2,189.

The expenditure which has been made of that appropriation has been chiefly for the procuring of materials under contract.

The estimate of the work by the Board is $46,805, and supposing the materials on hand and the unexpended balance to be about $6,805, it will leave as yet to be provided for the work $40,000.

Under existing circumstances I agree with the Board, that "no part of the said plan can be completed with the means at the disposal of the department, so as to render it effective."

Therefore, it is respectfully recommended, that measures be taken to dispose of the materials on hand, and that the unexpended balance be reserved for necessary purposes, in reference to the preservation of the materials which have been procured, should they not be sold.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Col. Corps Topograhical Engineers.

Hon. JEFFERSON DAVIS,
Secretary of War.

Returned with instructions to devise a plan for the expenditure of the appropriaption, in the manner most conducive to the end for which it was appropriated. Any material on hand which cannot be used on such plan will be sold, and the proceeds applied to the work.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *September* 18, 1854.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, September 30, 1854.

SIR: I have the honor to submit the revised plan of the Board in reference to the harbor of New Buffalo.

The impression with me, from the report of the Board, is, that with present means nothing effective can be done, referring to any substantial progress of the work, or which by any good results will render the work effective.

The expending of the present small balance of the appropriation would be of no useful account, unless in anticipation of future means; and, therefore, in my judgment, the better course is to retain present balance, to dispose of the materials on hand, and to use present balance only to perserve said materials until they shall have been disposed of.

Considering the advanced state of the year, and the climate of New Buffalo, nothing can be done there before the next season in the way

of depositing any crib-work in place; but from now till then is a highly favorable period for the procuring of material, the framing of cribs, and for the procuring of requisite auxiliary machinery.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Colonel Corps Topographical Engineers.

Hon. JEFFERSON DAVIS,
Secretary of War.

The chief of Topographical Engineers is called on for an explanation of the fact reported by the Board of Lake Harbors on Western Rivers, to wit: that a large part of the appropriation for New Buffalo, Michigan, has been expended in procuring material, and yet that material is in such proportions as to render it unavailable for any part of the work. And, also, to state whether boats and machinery constructed for places at which the whole appropriation has been expended cannot be properly transferred to New Buffalo, and the balance of that appropriation be thus saved from the higher expense of new boats and new machinery.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *October* 4, 1854.

OFFICE BOARD OF ENGINEERS,
LAKE HARBORS AND WESTERN RIVERS,
Washington, August 19, 1854.

SIR: The bureau having called the attention of the Board to the improvement of the harbor of New Buffalo, Michigan, I am instructed very respectfully to say that a plan for that object was submitted by the agent, J. R. Bowes, esq., under date September 19, 1853, and referred to this Board for its opinion. Upon this the Board presented its views, as may be seen in Senate Document No. 1, thirty-third Congress, first session, page 213. Since that time the Board has not received any new information affecting the question. But it has had time to give to the subject more attention than it was then in its power to bestow, and it has compared with Mr. Bowes' plan those which were formerly presented to the bureau upon the same subject, namely, by Lieutenant Berrien in 1835, and by T. B. W. Stockton in 1845. The essential features of all being the same, namely, to cut a navigable channel through the sand which separates Galien river, on which the town of New Buffalo is situated, from the lake, and to secure the sides of the cut with sheet-piling, and then to extend, in connexion with it, two parallel piers into the lake, the cut or opening to be carried from the requisite navigable depth of water in the lake to deep water in the river. The Board approves of these features of the plan, but it differs from the projectors in several particulars, the details of which it will now notice, remarking, however, at the outset, that many of the facts necessary to an enlightened consideration of the subject are wanted, and that, generally, the information in its possession is by no means as

full and accurate as it could wish, and that there is, moreover, a want of agreement in relation to some facts bearing upon the details of the plan, which it finds very embarrassing. The most important of these relate, first, to the soundings outside of the coast line, which do not agree, and do not even furnish points of comparison, for which reason it is that the length now proposed for the piers is only provisional—the Board not having the means of fixing it definitively; moreover, for the same reason, the direction to be given to the outward end of the windward pier cannot now be accurately determined, and because we do not know with certainty the direction of the prevailing wind, which is an element of the problem of the direction to be given to the piers. Again, in the configuration of the lake shore, and of the shores inside of the general coast line, there are to be found very notable disagreements between the maps and plans furnished by the several officers and agents who have presented their views upon the subject. Having carefully compared them, however, the Board has found reason for provisionally adopting the map which Mr. Bowes has presented, with his reports of February 10, 1853, and November 15, 1852, and it has projected upon it the outline of the improvement it would recommend, subject, of course, to such modifications as the actual form of the ground, and of the other elements of the problem, may suggest.

The harbor was surveyed in 1835, under the directions of Lieutenant J. M. Berrien, who then reported a plan for its improvement. In this report he says that his survey embraced about one mile along the shore of the lake, and about the same distance up the stream, the shores, channels, and edge of the hard ground, as well as the depth of water, being accurately determined and laid down upon the map which accompanied it, the soundings being carried into the lake to a depth of three fathoms, which depth he says is found immediately without the outer bar, meaning thereby the outward ridge of sand, of which ridges there are several that range nearly parallel with the coast.

Lieutenant Berrien describes Galien river as being small, varying from 60 to 100 feet in width, and for a mile and a half above its then mouth, winding through a marsh about a quarter of a mile wide, then filled up to the level of the water and covered with the usual marsh vegetation. The lake shore is sand, and is bounded by ridges of sand varying from 20 to 50 feet high, and terminating in flats near the mouth, the bottom of the stream being of mud, and the depth of water in the river above the point at which it assumes the character of a delta, 9 to 14 feet. The width of the stream at its mouth was then between 60 and 70 feet, with a minimum depth of three feet. At the time of his survey, the current at the mouth had a velocity of one and a half miles per hour, and during freshets, the velocity was three miles. He states, also, these velocities, &c., are a minimum, and are influenced as well by the force and direction of the winds as by the freshet. He also says that the lake shore is bolder here than at any other point within the region of sand examined by him, and that there was then 12 feet of water within 550 feet of the shore, and that the 18 feet curve was found only a few yards further out.

In 1839, T. B. Stockton, esq., the then agent at New Buffalo, presented to the bureau his views upon the subject of this improvement,

together with a map of the harbor. The Board finds in these views nothing requiring special notice, and therefore passes to the consideration of the plan submitted by Mr. Bowes on November 15, 1852, and more especially to his letter upon the same subject, dated February 10, 1853, with the chart accompanying it; copies of both of which are hereto annexed, as reference is made to them in treating of the plan proposed by him, as well as the plan the Board now recommends.

When formerly the Board had this subject under consideration, it was viewed only in its connexion with the statement of the annual estimates, and the report it made in relation to New Buffalo had reference solely to the report of the agent, Mr. Boyes, as may be seen by the following extract:

"The design for the improvement of this harbor, as described in the annual report of the agent, J. R. Bowes, dated September 19 of the present year, is to cut a channel 300 feet in width through the sand spit separating the mouth of Galien river, which at this point enlarges into a bay or small lake, from Lake Michigan, and to secure its sides with sheet-piling, and then to extend in connexion with it two piers into the lake of different lengths, the northern or weather pier to be 1,600 feet in length, extending over all bars, and terminating on a clay bottom in twenty-five feet water; the lee pier to be 700 feet in length, and terminating in 10 feet water."

He estimated the cost of executing the work at $91,955. The Board approved the main features of this plan, but it saw no reason, "with the facts then before it, to adopt the very unequal lengths given to the two piers." And the Board goes on to say, with reference to the project, that a final opinion on this and other points it deems proper to reserve for further consideration. Conceiving, however, that the piers should extend out at least to ten feet water, it approves of 700 feet each as the length of the piers, a length that would seem, by the report of the agent, to be necessary in order to reach that depth. Confining, then, the plan to two piers of 700 feet each, and leaving the cost of securing the sides of the cut until these are completed, the estimate would stand thus:

North or weather pier, 700 feet	$19,956	90
South or lee pier, 700 feet	19,956	90
Labor on the piers	11,468	70
	51,382	50
Contingencies, ten per cent	5,138	25
Total amount	56,520	75
Amount already appropriated	8,000	00
Leaving to be provided	48,520	75

Appended to Mr. Bowes' report and general estimate of November 15, 1852, is a separate estimate of the cost of 300 feet of pier work,

commencing on the shore of the lake, and extending thence to eight feet water, amounting to $11,385.

In view of the very limited amount of his means, Mr. Bowes proposes to restrict his operations in the first instance to the construction of these 300 feet of pier, which he would now sink with the upper courses one foot above the water, to connect and secure them to remain until another season, when any balance remaining of the appropriation could be applied as far as it would go towards their completion; and he proceeds to say: "It is not desirable, or the common practice, to build up piers to their intended height until the cribs are perfectly settled, which requires, in sandy foundations, one winter." Mr. Bowes concludes his report, as has been already said, with a detailed estimate of the total cost of erecting the 300 feet of pier, and he also gives a separate estimate of the quantity of *materials* required for that part of the structure, with a view to the application of the existing means in the best manner, and in order to the judicious apportionment of these means between the materials and workmanship, so as to leave sufficient for the construction. Moreover, he suggests that in closing the contracts for this locality, reference should be had to these estimates, and he asks to be instructed to build the requisite machinery for the work.

From the preceding statement we find that the existing appropriation is quite inadequate to the execution of a complete plan of improvement for this harbor, and therefore that Mr. Bowes is constrained to propose the application of the present available means to the execution of a portion of it, such that while it may constitute an integral part of a general plan, it shall, as a separate and independent work, be useful to navigation, should the means of completing it upon the original scale cease to be provided.

The Board is of opinion that a short pier, 300 feet, extending from the shore to no more than eight feet of water in the lake, could be of little value to navigators, and it cannot therefore advise the department to undertake that portion of the work, unless assured of being able to command the means of extending the proposition so as to establish in connexion with the pier, a navigable communication between the lake and the river; an extension that would involve the probable cost of excavating across the sand spit, and of sheet-piling the sides of the crib. For this would be required an additional sum of say $5,528, which, added to Mr. Bowes' estimate of $11,385 for the pier, would amount to $16,915, or $8,913, over and above the existing appropriation. This improvement, if even carried to no greater depth than eight feet, might give access and shelter to the smaller class of vessels.

Having thus noticed some features of the plans heretofore proposed for the improvement of this harbor, it remains for the Board to place its own project, and the considerations on which the same are based, before the department.

In the opinion of the Board, then, the works for the improvement of New Buffalo, should consist of the usual parallel piers, projecting into the lake, of a system of plank-piling, beginning at the inner ends of the piers and extending to the deep water of the river, and of dredging a channel between the piers and plank-piling, to extend from at least 10

feet of depth inside to 11 or 12 feet of depth into the lake, the probable length of the pier work to be about 1,050 feet, and of plank piling probably 1,180 feet, as shown upon the plan.

The location of the piers, and consequently of the entrance into the river, has been a subject of some consideration with the Board. The length of the beach, within the limits of which there is any room for a choice, is about 1,000 yards.

Formerly the outlet of Galvien river was at the northern end of this space. At present it discharges itself into the lake at the southern end. At the time of Lieutenant Berrien's survey, in 1835, the outlet occupied the position marked B on the chart. In 1845 it occupied the position C; and last year (1853) it had advanced to the position D. Prior to the time of Lieutenant Berrien's survey, it is said to have discharged itself at A; which is probable from the form and direction of the channel of the river immediately inside of and in contact with the beach.

Beyond the extreme limits now mentioned there is no choice, because to the north and south of these limits there are high sand ridges, varying, as Lieutenant Berrien informs us, from 20 to 50 feet in altitude, through which, to effect a practicable passage, would be as expensive as it would be uncalled for. As to the proper position there for the piers or entrance, viewing the question in an engineering point of view, the Board has no hesitation in recommending the position marked A upon the chart.

For the depth of the channel the Board has followed the practice of the bureau, which considers 11 or 12 feet as sufficient for the largest class of vessels in the rough waters of the open lake, while for the smooth waters of the harbor the Board proposes 10 feet. Accordingly the Board has estimated for a channel to extend from the deep water of the lake to the deep water of the river, or from 12 feet outside to 10 feet inside of the piers.

The width of the channels of the several harbors on the lakes differ from each other, and for the one now under discussion, various widths have been proposed. Lieutenant Berrien proposes 180 feet. Mr. Stockton proposes 200 feet, and Mr. Bowes estimates for a channel of 300 feet. For a harbor not likely soon to attract a very large amount of trade, a width of 180 or 200 feet, might be more than necessary for the wants of the local commerce; but New Buffalo lies upon a dangerous coast, and in stormy weather will undoubtedly be often resorted to for refuge, and will demand more room than it would be likely to require as a mere commercial port. For this reason the Board adopts the width recommended in Mr. Berrien's report, viz: 180 feet.

With respect to the probable length it may be necessary to give to the piers in order to fulfil the condition that they shall reach a depth of 11 or 12 feet, the Board finds some difficulty in the conflicting and insufficient information which it has upon that point.

Lieutenant Berrien in his report of Jannary 13, 1836, calculates for a length of 520 feet from the shore, for the north pier, and for a length of 560 feet from the shore for the south pier, both of them into 12 feet water, exclusive of the pier-heads.

Mr. Stockton in 1839 calls for a length of 810 feet for the north pier, and 730 feet for the south pier, into 12 feet water.

Mr. Bowes requires the piers to extend into the lake; the north pier to 25 feet water, 1,600 feet, and the south pier into 10 feet water, on a length of 700 feet.

Finally, the Board taking for its guide the chart compiled by Mr. Bowes, has decided to take for the length of the leeward pier 510 feet, and for that of the windward pier 810 feet. The additional length given to the windward pier being necessary for the protection of the head of the leeward pier, if the storms come from the north (mag.) as is supposed.

In view of the exposure of this part of the coast, the great depth of the sand, the steepness of the shore, and probable liability to extensive settlement of the cribs, the Board proposes to increase the breadth of the piers to 24 feet.

To effect the improvement of the harbor of New Buffalo, upon the general plan proposed by the Board, there would be required the sum of $46,805 25, according to the following estimate:

Estimate of the cost of constructing two piers at New Buffalo, Michigan, to extend to a depth of 11 *or* 12 *feet water in the lake. The aggregate length of both piers* 1,320 *feet, or* 44 *cribs* 30 *feet long and* 24 *feet wide each, and to rise six feet above the surface of the lake.*

COST OF ONE CRIB.

24 pine side-pieces, 12 by 12, 31 feet long, 744 feet, at 10 cents	$74 40
12 pine centre-strings 30 feet long, 360 feet, at 10 cents	36 00
36 pine ties, 12 by 12, 24 feet long, 864 feet, at 10 cents	86 40
8 pine bottom-timber, 12 by 12, 30 feet long, 240 feet, at 10 cents	24 00
730 pounds round iron, 1½-inch, for bolts, 3 feet long, at 4½ cents	32 85
42 cords of stone, at $8	336 00
Carpentry, labor, &c	150 00
1,800 superficial feet 3-inch pine plank flooring, at $14 per M	25 20
25 pounds 6-inch spikes, at 7½ cents	1 87
Estimated cost of one crib	766 72
Estimated cost of 44 cribs	33,735 68
Add for contingencies, 10 per cent	3,373 57
	37,109 25
For plank-piling channel inside of shore line	4,578 00
For dredging	5,118 00
Total cost of improvement	$46,805 25

It will be seen from the preceding estimate, as well as from that of the agent, that the appropriation will not suffice for the execution of the entire plan of improvement which the Board recommends.

The Board is of opinion, further, that no part of the said plan "can be completed with the means at the disposal of the department," so as "to render it effective."

Very respectfully, I have the honor to be, sir, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Eng., Pres't Board.

Col. J. J. ABERT,
Bureau Topographical Engineers.

OFFICE OF PUBLIC WORKS,
Michigan City, February 10, 1853.

COLONEL: As some changes have taken place at the harbor of New Buffalo, Michigan, since the last surveys were made, which may be unknown to the Board of Engineers, and believing these changes will have an important influence in determining the specific location of the piers, by changing it from the present mouth to a point further east, and although it will in no way modify the general plan of piers, which, I presume, will be that of the usual parallel piers, I have considered it my duty, in conformity with the instructions of Colonel Abert, chief of the corps of Topographical Engineers, to communicate to you these changes; and to more fully exhibit them, I hereby inclose a rough diagram, compiled from the surveys of Lieutenant Berrien in 1835, and of William Gamble, esq., United States agent in 1845, and also my own recent examinations, to which I most respectfully refer. Since the last surveys were made at this harbor, the Michigan Central Railroad has been extended to this place, and, to give it a connexion with Lake Michigan, it has constructed at New Buffalo, across the Galien river, near its mouth, a strong and substantial bridge, resting on piles closely driven. It has also connected this bridge with two bridge piers extending into Lake Michigan, as per diagram. The construction of this bridge across the Galien river has divided the harbor into two portions, one extending from the bridge to the mouth of the river, quite limited in capacity; the other portion is east of the bridge, which includes the main part and deepest water of the river, affording ample capacity and convenience for the future commerce of New Buffalo. If the piers should be located at the present outlet, without the bridge above mentioned should be removed, which would be attended with great expense and disadvantage to the Central Railroad Company, the harbor would be quite limited in extent, and communication with the main river would be impossible. The harbor of New Buffalo consists of an enlargement of the Galien river in the vicinity of its mouth into a lagoon or small lake, which is separated from Lake Michigan by a ridge of sand thrown up by the action of the lake. Its average height is about four feet above the level of the lake, differing in its breadth from four hundred to six hundred feet. The river, by its spring and fall freshets, has, at different times and places, forced a passage through this ridge and obtained an outlet. In summer its outlet is entirely closed by the action of the lake, and as the drift of the lake inclines towards the west, the outlet has changed in that direction. Four differ-

ent outlets are known to have existed at different periods, as marked (A,) (B,) (C,) (D,) on the accompanying diagram of two of these; (A) (B) are east of the railroad bridge, and (C) and (D) are west of it; the first of these, (A,) existed before the survey of Lieutenant Berrien, and, as it was adjoining high bluffs, must have been the outlet for some length of time, and this opinion is sanctioned by the fact that a channel now exists directly in connexion, and in the direction of this outlet, containing deeper water than is in the present mouth. The second outlet at (B) was opened, and the mouth of the river at the time of Lieutenant Berrien's survey in 1835; the third (C) existed at the time of Mr. Gamble's survey in 1845; and the fourth (D) is the present outlet. In selecting a location for the piers no difficulty exists at either (A) or (B,) and are the best points east of the bridge. They present nearly equal advantages; the point (A) has connected with it a good interior channel; it would require less dredging than at (B.) At either point a good outlet can easily be made, and after being once opened and protected by piers would be permanent. New Buffalo has all the elements for making a good interior harbor, and as soon as an outlet is made and permanently established by piers, admitting the water of Lake Michigan to flow in it, will, without doubt, increase the depth of water and widen the present channel, which is now only limited by light alluvial deposites, which may be carried out by the reflux of the lake and current of the river. The plan of the river, without doubt, is to protect the outlet with parallel piers, and I would suggest that the distance between the piers be at least three hundred feet; experience has shown the necessity of giving a wide entrance. At the early day of harbor improvements the entrance was made narrow, and in proportion to the size of steamboats and vessels then navigating the lakes; since which they have been greatly increased in length and beam, consequently require more room for a safe and convenient entrance.

All of which is most respectfully submitted by your obedient servant,

JOHN R. BOWES,
U. S. Agent.

Lieut. Col. JAMES KEARNEY,
President of Board of Engineers for W. R. and Harbors.

OFFICE OF BOARD OF ENGINEERS
LAKE HARBORS AND WESTERN RIVERS,
Washington, September 27, 1854.

SIR: I am authorized by the Board to make the following report, in conformity with the instructions of the Hon. Secretary of War, of the 18th instant, respecting the harbor of New Buffalo, Michigan. These instructions, endorsed upon the letter of the bureau of the 2d instant, transmitting the report of the Board upon this subject, are as follows, viz:

"Returned with instructions to devise a plan for the expenditure of the appropriation, in the manner most conducive to the end for which it was appropriated. Any material on hand which cannot be used in such plan will be sold, and the proceeds applied to the work."

The state of the appropriation in question is as follows:

August, 1852, amount appropriated for New Buffalo.....	$8,000 00
September 19, 1853, expended chiefly for materials obtained on contract and now supposed to be on hand.....	5,186 83
September 19, 1853, balance in the treasury.....	2,813 17

The materials on hand at the close of the fourth quarter of 1853, according to the returns of the agent, were as follows:

Timber, white oak, square,	14 by 14 ft.	by 30 ft.	100	pieces	$345 00
Do.	14 by 14 ft.	by 45 ft.	100	do.	674 00
Do.	14 by 14 ft.	by 50 ft.	66	do.	1,108 80
Do.	16 by 16 ft.	by 60 ft.	7	do.	168 00
White oak piles, 67.....					180 90
1½-inch bolt iron, 6,087 pounds.....					289 13½
Stone, 200 cords.....					2,000 00
Total material on hand					4,766 83½

According to contract prices—

Hence we have for the available means, at the disposal of the department, materials which cost, as per contract..	4,766 83½
Cash balance in the treasury.....	2,813 17
Amount.....	7,580 00½

Out of the balance in the treasury it will probably be necessary to expend for boats, scows, machinery, &c., for the purpose of carrying on the work, the sum of $2,650, thus:

For two scows.....	$600 00
For two scows with cranes.....	800 00
For two boats	300 00
For one moveable platform pile driver.....	250 00
For tools and implements	100 00
For superintendence and contingencies.....	600 00
Total	2,650 00

Presuming that the first object of the department should be the providing of these necessary means of carrying on the improvements in question, and that the sum of $2,650 should be reserved for that purpose out of the balance now in the treasury, the means actually available for materials and construction will be reduced as follows, viz:

Balance in the treasury, as above.....	$2,813 17
Deducting from which the sum reserved for the construction of machinery, boats, &c., as per estimate.....	2,650 00
The cash balance on hand will be	163 17
And the value of materials on hand at contract prices....	4,766 83
Showing a total means of.....	4,930 00

The Board, in its report of the 19th ultimo, proposed a plan for the improvement of the harbor of New Buffalo, to cost $46,805 25, and it stated that "no part of the same can be *completed* with the means at the disposal of the department so as to render it effective." It is clear, however, that whatever the plan of improvement may be, the machinery, boats, scows, and other mechanical means of executing the work must be provided in advance. These would cost about $2,650, as shown in the preceding part of this report. They would be necessary and conducive to the end for which the existing appropriation was made; they would be complete and effective, also, and within the means of the department, and the Board sees no more useful way of applying so much of the balance now in the treasury to the work.

The materials on hand are such as are suitable for crib work. They are useful, and, in fact, indispensably necessary, to the construction of the piers which constitute the sides of the entrance to our artificial harbors on the lakes, and which form part of the plan recommended by the Board in its report of August 19, but they cannot now be worked up, because the several articles are not in due proportion to each other with respect to quantities, some of them being much in excess, while in respect to others there is a total deficiency. For example, there is nearly stone enough for three cribs of thirty feet length each, enough bolt iron for seven such cribs, while there are no tie pieces. In fact, with the stock on hand we could not frame and put in place one thirty-foot crib; and, moreover, there are no plank piles for the sides of excavated channels. Undoubtedly it was the intention of the department to supply these deficiencies, and to correct in due season, and during the progress of the work, these disproportions, which are, it is presumed, mainly attributable to the failure of contractors to fulfil engagements at the commencement of a new work.

But with such a limited and unsorted stock of materials, the Board cannot devise a plan to which these materials alone could be applied in a manner conducive to the end for which the appropriation was made, and there are but two remedies which, in the absence of further appropriations, suggest themselves, viz: to supply the actual deficiency of means, if that can be done, by the sale of articles which may be found to be in excess of their proper proportion, and especially the perishable articles. Or, if on trial this scheme be found ineffectual to any useful end, that the whole of them be sold, or that they be placed, under the usual guards and conditions, at the disposal of responsible parties who will engage to carry on the work with the aid of means furnished from their own resources.

I have the honor to be, sir, very respectfully, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Eng., President Board.

Colonel J. J. ABERT,
Bureau Topographical Engineers.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, September 14, 1854.

SIR: Application was made some time since by the Illinois Railroad Company to open a passage through the United States pier, between the basin of the company and the river.

In order to obtain the most desirable information on the subject, the matter was referred for report to Brevet Lieutenant Colonel Graham, and his report, when received, was referred to the Board of Engineers on Lake Harbors and Western Rivers. Both reports are now submitted to the decision and direction of the Hon. Secretary of War.

Brevet Lieutenant Colonel Graham, in his report, also indicates an excavation line for the city, under the law of July 1, 1852. Upon this line the Board of Engineers also reports. The Board "fully approves of the views of Colonel Graham respecting these subjects," and "recommend them to be carried into effect."

The law of July 1, 1852, gives authority to the city to excavate, "according to the plan set forth in said memorial," but the law also empowers the Secretary of War "to cause the limits above designated to be marked out."

As the line of excavation marked out by Brevet Lieutenant Colonel Graham does not coincide with the plan (of the city) as set forth in said memorial, upon which the law of July 1, 1852, was predicated it appears to me as essential to the question that the city of Chicago should, by some formal act, accept or acquiesce in the line of excavation as recommended by Brevet Lieutenant Colonel Graham and by the Board.

In conformity with this explanation, it is respectfully recommended that the opening into the basin, as recommended by Brevet Lieutenant Colonel Graham, in locality, in restrictions, and in mode of operation, be approved. Also that the line of excavation be approved, if said line should also be approved, accepted, and acquiesced in by the city of Chicago.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Colonel Corps Top. Eng.

Hon. JEFFERSON DAVIS,
Secretary of War.

The application for permission to make an opening in the south pier is approved with the limitations and reservations recommended by Lieutenant Colonel Graham.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *September* 25, 1854.

OFFICE BOARD OF ENGINEERS
LAKE HARBORS AND WESTERN RIVERS,
Washington, September 13, 1854.

SIR: I am instructed by the Board to make the following report upon the letter of Brevet Lieutenant Colonel J. D. Graham of the 4th instant:

Colonel Graham's letter treats—

1st. Of the question of an opening in the south government pier at Chicago, in order to admit the passage of vessels between the river and the Illinois Central Railroad Company's basin at that place; and

2d. Respecting the improvement of the navigation by the corporate authorites of the city of Chicago, under the act of Congress of July 21, 1852.

The Board fully approves the views, recommendations, and suggestions of Colonel Graham respecting these subjects, and would very respectfully recommend them to be carried into effect.

Very respectfully, I have the honor to be, sir, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Eng., Pres't of Board.

Col. J. J. ABERT,
Bureau of Topographical Engineers.

Col. Graham's letter of the 4th inst., and his map G, No. 4, are herewith returned. J. K.

BUREAU OF TOPOGRAPHICAL ENGINEERS,
Washington, September 30, 1854.

SIR: I have the honor to submit the final views of the Board of Engineers in reference to the St. Clair flats. From their views it appears that to make a channel three hundred feet wide (exclusive of cost of dredge boat) will require (A) $27,252; and that to make a channel six hundred feet wide (exclusive of cost of dredge boat) will require (B) $59,563.

In these estimates the Board excludes the plan of protecting either or both sides of the artificial channel way by crib work and sheet-piling. It would be a fortunate event if some structure of this kind were not required. In my opinion it is essential, and will be required; and to avoid the evil of removing it in order to enlarge the channel at a future day, the work should, in the first instance, be applied only to one, the permanently fixed side. This consideration would probably add to the estimate for the three hundred feet channel about $5,000, enlarging that estimate (A) to about $32,000. It is also probable, in my opinion, that this protecting work will be required before the dredging be commenced.

Respectfully, sir, your obedient servant,

J. J. ABERT,
Colonel Corps Top. Eng.

Hon. JEFFERSON DAVIS,
Secretary of War.

The recommendation of the Board for the improvement of the middle channel of the South Pass by dredging, so as to give a channel three hundred feet wide at bottom and twelve feet deep, the sides having an equal slope to those of the natural channel, is approved as the plan to be first executed, when the necessary means shall be provided.

JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT, *October* 4, 1854.

OFFICE BOARD OF ENGINEES
LAKE HARBORS AND WESTERN RIVERS,
Washington, September 25, 1854.

SIR: In relation to the question of improving St. Clair flats, Michigan, a subject recently referred to the Board for consideration and a final report, I am instructed to make the following statement, viz:

St. Clair river, at its outlet in St. Clair lake, forms a very extensive delta, occupying an area roughly estimated at 70 or 80 square miles. Within this area the river breaks into numerous branches, and enters the lake very much reduced below its original velocity. Owing probably to this diminution of velocity extensive shoals are found in front of the delta, and in these shoals there are channels more or less useful for navigation, but obstructed by bars. The channel presumed to be most convenient for navigation is the south channel or pass, and its subordinate channels named on the charts.

The western channel, the middle channel, and the eastern channel of the South Pass.

One of the questions in the present investigation is, which of these channels should be selected for improvement?

The Board, while engaged upon the estimates for lake harbors for the fiscal year ending June 30, 1855, had before it an item for the improvement of the navigation of Lake St. Clair. It had before it also the report, plans, and estimates of Captain Canfield, late of the corps of Topographical Engineers, and, for the reasons "adduced by Captain Canfield, it was of opinion that the middle channel (of the South Pass) should be adopted for improvement; and, moreover, that the lesser width (300 feet) recommended by him be first opened, and hereafter, should the operation prove successful, and the wants of trade call for a greater width, that it then be increased to at least six hundred feet."

Captain Canfield was of opinion that sheet-piling should be employed for the protection of the sides of the proposed channel, and the Board in its report admitted this amongst the items which it adopted. He makes, however, the following remarks bearing upon the subject of the composition of the shoals, and the probable permanency of the channels:

"If it is borne in mind that the place is entirely out in the open lake, more than a mile and a half from any thing like shore, the fact will be apparent that there can be scarcely any perceptible current at that

place, not sufficient in any degree to effect the bottom." He says also, "it is found by the survey of last fall that scarcely any change has taken place in the depth and form of the channel within the last ten years when the first survey was made." These observations go to justify the opinion that the sides of an artificial channel would not probably require protection if they were cut to the same slope as that which we already find standing in the natural channel. For these reasons the Board is not prepared to advise the use of sheet-piling, or of any other protection for the sides of the proposed channel in the first instance, more especially if it is to be opened at first upon a width of only 300 feet with the prospect of enlarging it hereafter to a width of 600 feet or more, for it would savor of extravagance to establish lines of piles which must be necessarily removed as a preliminary to such enlargement, and it might be also objected that in a few years the piles would decay to the surface of the water, and, being in the open lake, would in rough weather be dangerous to vessels passing between them in the night. For these reasons the Board repeats the opinion that the plank-piling provided for in the estimate should not be used until experience shall have shown that they are necessary for the defence of the channel.

It should be observed that the lines traced in red upon the chart, indicating the proposed lines of improvement, are intended by the Board to show only the general position and direction of the work. It is desirable that the first excavation should be made upon the lines the most convenient for the ultimate *enlargement* of the channel, which should proceed at the same time from both sides of the original cut, nearly on straight lines, these being the most convenient for vessels proceeding up or down the channel, especially at night. The depth of the channel should be 12 feet.

Should the plank piling be omitted, there will be occasion for a greater number of channel marks than has been provided for in Captain Canfield's estimates. This, however, is presumed to be a subject within the province of the Light-house Board.

The contemplated light-house should occupy the position selected by Captain Canfield, namely, at R. Its distance from the nearest light, at the head of Detroit river, is but about eighteen statute miles. The light, therefore, need not be of a superior order, nor very elevated. A Fresnell illuminating apparatus of the fourth order would be sufficient. It should illuminate the whole of the horizon. The beacon light should be the usual lantern employed by the Light-house Board for wharf lights.

With the preceding modifications, the estimate for a channel three hundred feet wide at bottom and twelve feet deep, with sloped sides of 20 feet 1 inch, would stand as follows, viz:

Dredging 112,455 cubic yards for channel
" 44,982 cubic yards for sides

Total..157,437 cubic yards of dredging,

At twelve and a half cents	$19,680
Mud scows, tools, coal wharf, &c	4,000
Contingencies, excluding risk to vessels, &c., by fire or weather, 15 per cent	3,552
Total cost of improvement, exclusive of dredger, which has been already provided	27,232

Estimated cost of excavating a channel at the same locality, six hundred feet wide at bottom and twelve feet deep, with sloped sides 20 feet 1 inch:

Dredging 112,455 cubic yards of channel
" 44,982 cubic yards of sides

Total..157,437 cubic yards excavations, at 12½ cents	$19,680
112,455 cubic yards of channel at 25 cents	28,114
Mud scows, tools, coal wharf, &c	4,000
Contingencies, as per preceding estimate, at 15 per cent	7,769
Total cost of improvement, exclusive of steam dredger.	59,563

As already noticed, the Board has had before it, during the investigation of this subject, the report of Captain Canfield, contained in the printed copy, third part of the message and documents of the President of the United States at the commencement of the first session of the thirty-third Congress, page 145, together with a manuscript copy of Captain Canfield's plans. Also, opinions reported by this Board upon the same subject, and contained in the document already referred to, page 208. It had, also, the map of survey of the St. Clair flats, executed by Lieutenant Macomb, in 1842, under the direction of Captain Williams, late of the corps of Topographical Engineers, together with Captain Williams's report upon the proposed improvement; and, finally, it had the surveys executed in 1852 by Captain Macomb, of the corps of Topographical Engineers, and the views of the bureau, set forth in its report of May 28, 1852, printed in Ex. Doc. No. 76, thirty-second Congress, first session, Senate.

A copy of the chart and plans accompanying Captain Canfield's report is transmitted herewith, and the other manuscript matter is returned to the bureau.

Very respectfully, I have the honor to be, sir, your obedient servant,

JAMES KEARNEY,
Lieut. Col. Top. Eng., President Board.

Col. J. J. ABERT,
Bureau Top. Eng.

APPENDIX G.

WASHINGTON, *June* 1, 1854.

COLONEL: I have the honor herewith to submit the original note books of comparisons and measurements made in September and October, 1852, on the base line at Mackinac point, Michigan, for the survey of that portion of the northern lakes lying in and near the straits of Mackinac; and also the original record of all the reductions.

These reductions were also revised under the orders of Captain J. N. Macomb, corps of Topographical Engineers, in charge of the survey of the lakes, and the revisions retained as duplicates in office of the survey at Detroit.

And agreeably to your orders, I now submit such a description of the apparatus and summary of the final results as, I trust, will be sufficient to explain the mode of measurement.

The base is upon the southern shore of the straits of Mackinac, far enough in rear of the site of the old Fort Michilimackinac, of which some traces still remain, to clear the bend in the shore to the SE. of the old fort. Its western terminus is on McGulpin's point.

This line was selected by Captain Williams, corps of Topographical Engineers, in 1842, when the project of the survey of these straits was first suggested, and an approximate measurement made by Lieutenant Gunnison, corps of topographical engineers, in 1844, fixed the length of the base at 6.08 miles. The SE. portion of this, however, is very unfavorable, lying principally through swamp.

Upon a re-examination of the ground, and a revision of the triangulation, it was determined, with the concurrence of Captain Macomb, to shorten the base, which a new scheme of triangles rendered perfectly admissible.

When the triangulation of this region is extended westward through the Beaver islands, Fox islands, &c., to the NW. shore of Lake Michigan, a more suitable base will be found upon the shores of Green bay. This one is intended to serve the present purpose of rendering the surveys in this vicinity immediately available for publication, and may be used eventually as a base of verification.

The difficulties in carrying on a very extended scheme of triangulation along the N. and NW. lakes, from their width, the flatness of their shores, and the great extent of the wooded region bordering upon them, will make the frequent measurement of bases unavoidable. For that reason, it was essential to obtain such an apparatus as would insure, in addition to accuracy, great facility of transportation and manipulation.

The astonishing results obtained upon the survey of the coast with the compensating apparatus made under the direction of Professor Bache, the superintendent, (the general plan having being devised by him, and the details by Mr. Wurdemann, mechanician, now established in Washington as a mathematical and astronomical instrument maker,) left no doubt as to the proper kind of apparatus to be procured, and Mr. Wurdemann was requested to turn his attention to such modifications to the one he had already made as would render it more suited

to our wants, especially that it should be lighter, smaller, and of course cheaper.

This plan and estimate were approved by the department, and I have every reason to be satisfied with the results of his industry and ingenuity.

The general features of the apparatus, of which I propose a description, is—

1. That all its parts are of metal.
2. That it is compensating for changes of temperature.
3. The mode of measurement is by simple contact of one end of one system of bars, called tubes, with the end of another.
4. The length of each tube is five yards or fifteen feet.

And the whole consists of the following parts, viz:

a. Two sets of compensating bars, each fifteen feet long;
b. Four trestles or stands, two to each tube;
c. Eight cast iron foot plates, with levelling screws;
d. One transit telescope and stand, for alignment;
e. One brass standard bar cut to the length of five yards, and previously compared with standard United States yards, in a box on rollers for comparing length of tubes.
f. One contact level apparatus for making comparisons of tubes with standard.

Description of the tubes.—Two bars set edgewise one above the other, the lower one of brass, the other of wrought iron, are firmly fixed together at one end by means of a stout cross piece of iron, and far enough apart to allow the insertion between of a number of small rollers upon which the iron bar rests along its whole extent from the connecting piece; the cross, or lower bar, resting on a larger set of rollers that have their pivots in iron uprights which are fixed to an iron tube supporting the whole of the interior parts.

This tube is 7¾ inches in diameter, of sheet iron, about one-twelfth of an inch thick, perforated through its whole length and circumference, for the sake of lightness, with four inch circular holes arranged at equal distances and diagonally with respect to the axis of the tube.

To protect the bars from local and sudden changes of temperature, as well as to render all changes of temperature as uniform and gradual as possible, the whole is cased in a double tin tube with a space between of about 1½ inches; the two cases being connected at frequent intervals with rings (of tin) soldered to each.

On the end of the iron bar, near the connecting piece, is screwed a piece of iron to which is attached a sector bearing a level seven inches in length, moved by means of a tangent screw whose head projects through the top of the tin case. The scale of the sector, and the scale of its attached level serve, together, to indicate the inclination of the bars.

The sector bears on its upper part a contact level hanging in steel pivots, and having below a small projecting arm of steel for contact.

To the lower part of the sector is attached a piece in the shape of a V, bearing a lever with its pivot at the apex of the V; this lever has at its upper end a hardened steel screw passing through it and abutting against the small projecting arm of the contact level. Jnst below this

screw, and on a line horizontal with the axis of the sector, there is also affixed to the lever a piece of hardened steel, the face of which is an arc of a circle having its centre in the axis of the sector. So that, at all inclinations, the horizontal distance between the face of this piece and the axis of the sector will be the same.

A steel rod plays against this steel curve. This rod is supported by two uprights moving upon a piece attached to the brass bar, and forming with it a jointed parallelogram. It projects about four inches beyond the end plate of the tube, terminating in an obtuse knife-edged agate set in a piece of brass. A cap is screwed over this when the apparatus is not in use.

The iron tube containing the bars is attached to trestles, of which a description will be given further on. The point of support is about 3¾ feet from the end. Now if the end piece, to which one end of the bars is firmly fixed, were attached to the iron tube, the changes of temperature would constantly shift this end point backwards and forwards as much as the tube expands and contracts.

To obviate this it becomes necessary to attach the end to a compensating rod which is fastened to the iron tube at a point perpendicularly above the trestle. This rod consists of three tubes, two of iron and one of zinc, fastened inside of each other according to the well-known manner of making compensating pendulum rods.

The compensating, or outer end of this, bears a screw nut in which turns a screw that has a shoulder against the connecting piece of the two bars. This screw has a head projecting beyond the tube, and enables the operator to move the bars for the ultimate contact. A strong spiral spring gives it an opposing motion.

The compensating contrivance is at the other end of the bars. It consists in a simple lever having its axis at the lower end, which is attached to the end of the brass bar and two knife-edged abutting pieces—one nearly in the middle of the lever and acting against a steel plate fixed to the end of the iron bar; the other on the upper end giving the compensating motion to a steel rod by pressing against a steel plate attached to the rod; a spiral spring keeping this last in constant contact.

The distances between these three points are determined from the relative expansions of iron and brass bars. They are first ascertained from theory, and ultimately corrected to correspond to the actual expansion of the bars themselves.

This steel rod projects through the end of the tube as at the other end, terminates with an agate ground to a plane and set in a piece of brass, and is also protected by a cap when not in use.

Opposite to the sector a plate glass window is set in the casing to allow a view of the sector and levels. There is a similar window at the compensating end, and one near the middle of the tube.

Of the trestles.—Two stout iron rings are soldered on the tubes at a distance from the ends of one-fourth the length of the apparatus. To these are fixed the supporting parts to connect them with the trestles, which are, on the secter end, a horizontal axis with trunnions and stays, and on the compensating end, a ball resting in a socket, by which it accommodates itself to the position of the tube on the other trestle.

The sector end trestle, (or rear trestle,) has three iron legs, m

gas tubing, with cast iron connecting pieces above and below. In the centre of these is fixed a 2¼-inch iron tube nearly two feet long, with a two-inch sliding tube within it, moved by a rack and pinnion, having an outside crank and a catch to stop it at any desired height. Within this is an iron barrel turning on a steel axis, and on the upper part of the barrel is a broad flange with a level cog wheel, to which a rotary motion can be given by means of a smaller cog wheel put within reach of the operator by a long handle reaching beyond the rear end of the tube. This allows a perpendicular motion of about two inches, and is intended for final adjustment of the tube in altitude; the large motion being given by the rack and pinions.

Two sliding plates of nine inches in length, with a top plate of six inches, with their screw arrangements, give the necessary lateral and longitudinal motion; also, by means of long handles projecting beyond the rear end of the tube.

All the longitudinal steadiness of the apparatus being entirely dependant upon this rear trestle, the other trestle or stand is set upon two legs only. Its inclination being limited to the 1½-inch sliding motion of the rear trestle, the tendency to press in either direction by this slight deviation from the perpendicular is very small.

This trestle, therefore, is provided with the lateral slides only, moved by a crank. It has, also, the fine and large motions in altitude as in the rear trestle.

The foot plates.—To prevent the legs of the trestles from sinking in the ground, and to give them steadiness, they are made to rest upon cast iron foot plates. These are provided with stout capstan head leveling screws at the points where the feet of the trestles rest; the head of the screw being hollowed out to receive the foot of the trestle. There are eight of these plates in order that they may be put into position in advance as the measurement progresses. Their position in alignment and level is established by a guage.

The transit.—The alignment is maintained along the base by the aid of a transit instrument of eighteen inches focal length, set up in advance of the measurement. The head of the stand upon which the instrument rests is furnished with a small lateral motion, by antagonistic screws, to facilitate the placing of the optical axis of the telescope in line.

The standard bar.—The means of testing in the field the compensation and absolute length of the apparatus, consists in a standard brass bar of five yards in length, and a contact level apparatus for comparing the tubes with this standard.

The contact level.—On a brass bed plate about 6 by 4 inches, and half an inch thick, a slide three inches long is made to move horizontally by means of a micrometer screw. This screw has exactly fifty turns to the inch, with a drum head projecting beyond the plate on the right hand side, divided to two hundred parts, and a spiral counter spring to insure its position on the plate.

The slide, with a simple index line, moves along a scale of $\frac{1}{50}$ inch, upon the edge of the bed plate,) for reading the whole turns of ew. On the inside of the drum head there is another index to e divisions. On the inner end of the slide, about the middle

of the bed plate, there is a forked upright, between which is poised a level on steel pivots, having a graduated scale of ten divisions to one on the drum head. A preponderance to the right hand or screw side is given to the level by a small weight.

Below the centre of motion of the level there projects a hardened steel plate, against which a short, round bar, with rounded steel ends, abuts from the left. This bar projects about a half an inch beyond the bed plate, and lies upon two rollers let into the bed plate, to make the movement of the bar as easy as possible. The bed plate, with its arrangements, is firmly fixed on the top of a wooden or stone post by means of screws or of plaster of Paris.

At a distance a little greater than the length of the standard bar another post is set in the ground, the fixtures upon which consist simply in a strong bracket with a steel screw through the upper portion, presenting at the end a hard and polished surface, slightly rounded. This must be fixed on the post opposite, and at the same height as the short abutting bar of the contact level, and at nearly the length of the standard or tube to be compared; the abutting pieces being both made to project beyond the inner faces of the posts.

The standard is laid, in a box and on rollers, between these abutting pieces and the bracket screw is turned until it touches that end of the bar. They are then kept in contact by attaching a spiral spring from the bracket to a small pin near the end of the bar on its upper side. Then, at the other end, the slide is moved by the drum-head towards the end of the standard bar until the level reads, as near as can be, alike at both ends of its scale. The reading of this, as well as the reading of the drum-head and slide-scale, are recorded, as also the temperature of the bar. The bar is then removed and the length to be compared, the tube inserted between the parts, and the process repeated to obtain the length of this.

It will be seen that a division on the drum-head, being $\frac{1}{200}$ of $\frac{1}{50}$ of an inch, is $\frac{1}{10000}$ of an inch, and, consequently, one division on the level is $\frac{1}{1000000}$ of an inch. This can be read off with perfect certainty, and without the aid of a magnifier.

Results of the comparisons.

The apparatus was ready for adjustment about the middle of July, and the final adjustments and comparisons occupied until the middle of August, when it was shipped for its destination, and safely landed on the ground on the 1st of September.

The last comparison in the shop gave the following result:

Difference between standard bar and United States standard yards.

Nos. 40, 41, 42, 43, and 44, at 62° Fahr., =0.0063 inches.

The readings of the contact level being, bar, 2370; yards, 2307. The yards being short, 0.0041 inches, gives the true length of standard bar, =15 feet, 0.0022 inches. The rate of expansion being 0.0017 for 1° Fahr., for the whole bar.

There was a difference of +0.0002 inches between the standard and

each of the tubes, making these last each 15 feet 0.0024 inches. The last reading being for bar, 2566; tubes, 2467; temperature, 67° .95.

In order to test these comparisons, a suitable spot was selected close to the base line, over which a temporary shed was built of boards, open to the north, so as to exclude the sun's rays, and two wooden posts planted firmly in the ground to receive the contact level and abutting piece. These posts were about 15 feet 2 inches apart, with their tops sawed to the same height, determined by a theodolite.

The standard bar, resting edgewise upon the rollers in its box, was set up between these posts upon two wooden trestles, both ends of the bar projecting equally beyond the ends of the box. The box, instead of resting directly upon the trestles, was made to rest upon pieces of plank set lengthwise upon the trestle, with a roller between each trestle and the board, and two rollers between each board and the bottom of the box, thus spreading the supports, and preventing any spring or warp, and besides giving the box, as well as the bar, as much freedom of motion as possible.

For the purpose of keeping the bar in the middle of the box and on the rollers, soft cotton was interposed between the bar and the sides of the box, and at such distances as to serve at the same time as supports to six thermometers laid along each side of the bar, at regular distances apart.

The bar was kept in contact with the abutting piece at one end by hooking on the spiral spring, as before described, and the comparison made by turning the micrometer screw-head until the abutting bar of the contact level was made (by pressing against the projecting steel pivot of the level) to poise the level as nearly horizontal as possible.

These comparisons and readings were made every half hour during the day, (September 3,) and the temperatures carefully noted. It being found, however, that the abutting piece had been set rather too close to admit of the free admission of the tubes between the posts, the position of this had to be changed, and, when reset, the comparisons were again repeated on the 7th and 8th September. The same comparisons of the standard bar were also made on the 30th September, and on the 1st, 2d, and 4th October.

The general results of all these for the linear expansions of the bar are as follows:

Series.	Expansions for 1° Fahr.	No. of comparisons.
First	0.00142	48
Second	0.00163	51
Third	0.00146	34
Mean	0.00150 inches for whole bar for 1° Fahr.	

Length of the bar=180.0022 inches; and $\frac{180}{0.00150}=\frac{0022}{15}$=0.000012002 for the lineal expansion for 1° Fahr.

The expansion determined by Mr. Wurdemann, as before stated, was 0.0017 inches for 1° for the whole bar, giving for the lineal expansion for 1° Fahr.=0.000010586.

The next step was to ascertain, by actual comparison, the absolute length of each tube, and if their compensation had been deranged by the journey.

Two foot-plates were set in position between the posts and the tubes, successively and alternately with the bar, placed upon them the sector end of the tube next to the abutting screw.

By means of the handles and screw-head at the end of the tube, whenever a comparison was required, the agate knife-edge was made to bear against the polished end of the abutting screw until the contact level of the tube was brought to a level, and at the same time (one person being stationed at each end) the reading of the level of contact of the comparator was obtained as before described.

The results of the several sets of comparisons, both before and after the measurement of the base, are as follows:

TUBE No. 1.

	Expansion for 1° Fahr. for the whole length.	No. of comparisons.
September 6 =	— 0.00023 inches	5
September 7 =	+ 0.00022 do	8
October 4 =	+ 0.00004 do	10

TUBE No. 2.

September 6 =	+ 0.00034 inches	8
October 4 =	+ 0.00033 do	10

From which it would appear fair to assume that no material change had taken place in tube No. 1, but that tube No. 2 required a correction for temperature.

Before making the comparisons, and also after the measurement of the base, the sectors of the tubes were adjusted by means of a theodolite set up about 100 feet distant from the tube, and at right angles to the middle of it, thus: After levelling the theodolite carefully the horizontal wire of the telescope was brought to bisect the agate at one end of the tube, the telescope then directed to the agate at the other end, and the two brought into the same level by means of the trestle movement. After which the sector reading was brought to zero, and the long level adjusted to it.

After the measurement, the adjustment of the sectors of both tubes were found to have been slightly changed. This will account for the correction which will be found in the detailed record of the reductions, and teaches the necessity, in future measurements, of examining this adjustment more frequently.

Assuming the expansion of the standard bar to be 0.0015 inches for 1° Fahr. for the whole bar, the final results of the comparisons for the absolute length of the tubes are as follows:

Length of tube No. 1, from comparisons before measurement of base..... 179.99815 inches.
No. 1 do. after do ..... 179.99954 do.
Mean length of tube No. 1.—179.99884 inches—4.99996 yards. Logarithm = 0.6989672

Length of tube No. 2, from comparisons before measurement of base..... 179 99986 inches.
No. 2 do after do ..... 180.00217 do.
Mean length of tube No. 2.—180.00101 inches—5.00003 yards. Logarithm = 0.6989726.

Measurement of the Base.—The most convenient point for landing the apparatus is near the middle of the original line, and as after having

determined to shorten the base, as before mentioned, the southeast termination towards station B became indeterminate; it was decided to commence the measurement near the middle, to measure in the direction of station B as far as the ground would admit, and to return to the point of beginning and measure in the other direction towards McGalpin's Point, (station A.)

The ground had been previously cleared for a width of some twenty feet, and a party of some six men was kept in advance of the measurement to cut off for a width of four feet in the centre all the sod, roots, &c., from the surface, cutting down as far as the firm soil wherever it was practicable, and also levelling the space to be occupied by the foot-plates.

By the transit instrument stakes were placed at proper intervals in the line between the triangulation stations A and B, already standing at the extreme ends of the original base. Upon these stakes the transit was subsequently set to keep up the alignment of the tubes.

The measurement was begun by setting up tube No. 2 in line by means of the transit standing upon the first stake established in advance of the point of beginning. The tube being moved by the tangent motion of the trestles until the + pairs of the transit were made to bisect the lights fixed upon the upper edge of the tube at each end. The first tube once placed, the subsequent alignments were made by simply bisecting the forward agate of each tube in succession.

Just under the forward end of this first tube a marble block 8 or 10 inches thick, with a smoothly-dressed upper surface of 14 inches square, was firmly bedded in the ground, upon which, determined by the transit, a fine line was traced with the point of a penknife in the direction of the base, and with the help of a theodolite set up nearly at right angles to the base a second line was traced, representing the intersection on the stone of the vertical plane passing through the extremity of the front agate.

The intersection of these two lines marked the point of beginning upon the ground.

The stone having been carefully secured and protected, was left standing to take up the point in the subsequent measurement in the contrary direction, towards A.

The same means were used to mark the termination of each day's work, although the stone was not in every instance left standing after the point had been taken up.

In transferring the point from the ground to the tube, the theodolite + hairs are made to bisect the mark on the stone, the telescope raised to the height of the tube, and the apparatus moved by means of the tangent motion of the trestles until the agate is brought into the proper direction of the + hairs.

This first tube having been put in position upon its foot plates, and the remaining three sets of foot plates also set in line by the transit and foot plate guage, tube No. 1 was lifted into its place in advance, aligned by means of the transit, levelled and set to its proper inclination, and the contact made by the proper end screw, the manner of proceeding being in each case as follows:

Four men are required to lift the tube, one at each handspike. The

principal is stationed at the rear end of the tube, an assistant at the forward trestle. Another assistant is at the transit in advance.

Two men manage the guage for setting the foot plates. Two men carry the foot plates from the rear to the front. The assistant at the forward end of the tube superintends the foot plate men.

A party of six men, in charge of an assistant, is in advance, preparing the ground to receive the foot plates.

At the word, ready, raise, the tube is lifted and moved forward, passing to the right of the tube left standing, and set upon its foot plates already prepared to receive it. Two of the handspike men take hold of the elevating crank handles of the trestles, one at each. The other two go after the foot plates left in rear, and bring them to the front. The principal sets the sector to its proper inclination, and gives the word raise or lower in rear or in front, as required, until the tube is brought to nearly its proper height and inclination. The word is then given—align—to the assistant at the transit, who, by signs, directs the motion to be given to the tube, which movements are made by the principal at the rear end by means of the long handles projecting from the end of the tube, and at the forward trestle by the assistant.

The bars are thus brought into their proper place in inclination and direction, the rear agate of the forward tube within a fraction of an inch of the forward agate of the rear tube, when, by means of the milled-head screw projecting from the rear end, the whole arrangement of bars within the tube is moved back and brought into contact with and pushed against the forward agate of the rear tube until the level of contact arrangement designates zero; then the bars are in position. The reading of the sector is recorded, the thermometers read, and the men take their stations at the rear tube and proceed as before.

No attempt was made to keep up continuous grades along the line. The tubes were kept level as long as possible, then for short distances an elevation of 1° or 2° generally was given to them to obtain another level reach. To facilitate reductions, the same inclinations were repeated as much as possible.

The measurement was continued in this manner towards station B for 391 tubes, when the ground was found too unfavorable to proceed further.

This termination, which in the triangulation is designated as station B′, is marked by a line stone post 4½ feet long, sunk so as to bring its upper end two feet below the surface of the ground. This is dressed smooth, and has a silver ten cent piece set in, upon which a fine line marks the termination, fixed by means of the theodolite, as at the point of beginning.

As a further precaution, a granite stone was planted 22 feet 4 inches to the north of the line, the top of which is marked with a +, the centre of this mark is on a line with the mark on the centre stone, and also on a line with a similar mark on another stone set up at about the same distance on the south of the line. But the line passing through these marks is *not* at right angles to the base line.

The tubes were dismounted from the trestles and the whole carried back to the point of beginning, whence the measurement was taken up and continued in the contrary direction. This needs no further descrip-

tion, except in two instances of unfavorable ground, where some preparations had to be made to obtain the requisite steadiness to the tubes.

On a marsh of some 350 feet across, fortunately dry at the time, the whole distance was bridged over by longitudinal sleepers laid continuously three feet apart, with cross ties spiked down at intervals corresponding to the distances of the foot plates from each other, so that each plate rested upon two cross ties. On each side of this boards were laid to walk upon. By being very cautious in handling the apparatus, this ground was crossed over without difficulty. The stability of the tubes on the bridging was tested by a theodolite set up on firm ground some little distance off.

Passing this the ground continued *springy*, and it was found impossible to reach firm soil by clearing for any reasonable distance, without the risk of reaching water. Recourse was had to stout cedar timber frames with a projecting point under each corner; these were driven firmly in the ground. Four of these frames were made and set in succession in advance, upon which the foot plates of each tube were made to rest. These answered a very good purpose, they were easily managed, four men moving them from rear to front, and took but little time to put them in position.

The northwest termination of the base, on McGalpin's point, lying under the signal of station A, is not yet marked, and cannot be until the station is removed. But at the end of the 1419 tube from the station B′, 306 feet from station A, a stone post was sunk in the ground, as in the former case, upon the top of which is set a silver five cent piece, upon which two lines are drawn, (not at right angles,) the intersection of which marks the termination of the 1419 tube. The top of this post is about two feet below the surface of the ground.

From this an off-set line was measured of 22 tubes' length, making an angle of 60° with the base line, to serve as a base to connect station A. The termination of this off-set is also marked by the intersection of two lines drawn across a five cent silver piece set in the top of a stone post sunk in the ground, well rammed and secured as before.

The connexion by triangulation has since been carefully made by Captain Macomb.

I have avoided in this general description the details of the reductions, etc., referring to the accompanying papers, and those in the office of the survey at Detroit, for those particulars.

The resulting length of the base from station A to station B′, is—

7195.82444 yards; log. 3.8570806;

which reduced to the level of the sea, assuming the altitude to be 216 yards, is—

7195.60197 yards; log. 3.857067012.

The reductions for inclination were made by the formula

$$B-b = \text{correction} = \frac{\sin^2 1''}{2} 0^2 B;$$

from which a table of reductions was made for each tube for each grade.

To test the measurement, the last 100 tubes (1,500 feet) were re-measured, resulting thus: A line was drawn (as before described) across the upper surface of a marble block sunk in the ground at the end of the 1319 tube; on returning to this, after measuring 100 tubes and back, without attempting to keep the same grades, the line marking this last termination was 0.1666 inches beyond the first, i. e., towards station B'; whence

	Yards.
The sums of the reductions for grade, etc., in the first measurement of 100 tubes, was	0.0208551
Sums of the same for second measurement	0.0260276
Differences in yards	0.0051725
Difference in inches	0.1862100
Actual distance between the lines on the stone	0.1666666
Difference of the two, or difference in the measurement of 1,500 feet	0.0195434 of an inch.

As to the time taken in the whole measurement, the greatest distance measured in one day was 1,950 feet, or 130 tubes; and the average day's work of 7 hours, 1,125 feet (75 tubes.)

In this duty I have to acknowledge the assistance of Captain J. A. Macomb, and the late Captain Gunnison, corps of Topographical Engineers, and Mr. John Lambert, and the crew of the steamer Surveyor; as also, occasionally, of Lieutenant Reynolds, corps of Topographical Engineers, and Messrs. J. A. Potter and W. Hearding.

Respectfully submitted.

THOMAS J. LEE,
Captain Topographical Engineers.

Colonel J. J. ABERT,
Chief of Corps of Topographical Engineers.

APPENDIX H.

WASHINGTON, D. C., *September* 19, 1854.

SIR: I have the honor to make the following report of operations connected with the Florida canal survey during the past year.

The instructions given by the chief of the corps directed the following examinations to be made preparatory to the final surveys, to wit: an examination of lines connecting the head of navigation of the St. John's with Charlotte harbor, with the Manatee survey, and with the deep water of Tampa bay. Also, an examination of any other lines that a further acquaintance with the country might render necessary.

Under this last discretionary authority, the country from Tampa to the head of the Ocklawaha river, and from the St. John's to the Big Santa Fé pond, was gone over preparatory to further work if deemed sufficiently favorable.

The examination of Charlotte harbor and vicinity determined that that bay presented no advantages over Tampa as a terminus for a canal, but on the contrary was inferior to it; and it was concluded that the instruments alone could decide as to the relative advantages of the remaining routes; hence full surveys were made of all of them, together with that of a line from the mouth of the St. Mary's to the harbor of Cedar Keys.

It is believed that these various surveys have been prosecuted with an energy and success, as regards the amount of work done, that will compare favorably with that exhibited by any other party in the field for the same period of time, (a few days short of four months.) The following is a brief summary of the last winter's work:

The total length of the four lines surveyed was 377 miles; these lines were each cut out, cleared for the level, and measured off into distances of 100 feet, which were marked by stakes having the proper numbers upon them. (When the country was very flat these stakes were placed at intervals of 200 feet.)

The height of the ground at each stake was carefully ascertained by the level, together with that of as many other points as the inequality of the surface rendered necessary, whole recorded, and the off-sets to the right and left of the lines were made as often as from the nature of the country was deemed important. The various lakes met with were sounded, and streams crossed gauged, that could be of use as data in the final report.

The number of miles measured and leveled on the main lines, was	377
The number of miles of off-sets measured and leveled, was	17
The number of points, the heights of which were determined and recorded, was	12,948

In addition, the river St. John was sounded from Palatka to Lake Jesup and the Ocklawaha, and examined for a distance of 85 miles up from its mouth.

At present the drawings and reports of the surveys are rapidly being completed, and it is believed will be ready to meet any call that may be made for them by Congress at its coming session.

In concluding this annual report I take occasion to call your attention to a preliminary one, made in July last, in connexion with this same subject. The object of that report was to state the propriety of a further appropriation for continuing the canal survey. Without further examinations in Florida, it is impossible for an engineer to decide whether the best route for a canal has yet been surveyed or not; and the results at present obtained clearly indicate that at least one more line, possibly two, should be run across that peninsula before such a decision is attempted.

This project of a canal, having been taken for the second time by government, it is most proper that it should not be dismissed until all desirable information and data are obtained, thus allowing definite and final conclusions as to its practicability, or otherwise, to be drawn.

In the present stage of the surveys *eight* months' additional labor would enable the engineer to complete all work desirable to be done; and as the field-marks of the surveys already completed are still fresh and easy to be recognized, the work could now be readily taken up and carried on to completion—whereas, if time elapses, (the country being yearly burnt over,) every important mark that has been left may become obliterated and destroyed, requiring much of the instrumental labor to be performed over again.

The particular lines of survey indicated in the report of July were from the bend of the Ocklawaha to the harbor of Chrystal river, and from the head waters of the Ocklawaha to the sources of the Withlacoochie river. This last line is important in connexion with the lines surveyed last winter, and, had the appropriation held out, would have been taken up and completed while the party was then in the field. The country proposed to be run through is almost entirely unknown, and it is believed there are many lakes and other sources of water important in connexion with the summit level of a canal. In addition, I am desirous that the summit pass of the line running from Black creek across the peninsula, as surveyed under the direction of the Board of Internal Improvement, existing in 1826, should be again examined for the purpose of comparison with the lines recently surveyed.

In accordance with the above statements I have the honor to request that a further appropriation for the Florida canal survey be recommended.

The subjoined is an estimate of the amount needed:

Outfit of party.

Four wagons, army pattern, delivered in Florida, at $180.	$720 00
Twenty-four mules, at $140.	3,360 00
Harness for mules, at $50 per team	200 00
Tents, 3 wall and 6 common	165 00
Axes, spades, tools, boring-rods, &c.	100 00
	4,545 00

Survey.

The cost of an efficient party in the field, as ascertained from last year's experience, is about $1,200 per month; to accomplish the work indicated will take eight months, eight months, at $1,200	$9,600 00
Transportation of officers per diem, and office expenses	1,000 00
Total	15,145 00

I have the honor to be, sir, very respectfully, your obedient servant,

M. L. SMITH,
Lieutenant Topographical Engineers.

Col. J. J. ABERT,
Col. Corps Top. Engineers, Washington city, D. C.

APPENDIX I.

OFFICE OF GENERAL GOVERNMENT ROADS
TERRITORY MINNESOTA,
St. Paul, September 15, 1854.

SIR: I have the honor to make the following annual report of operations on the general government roads in this Territory. The date of my last report was September 17th, of last year. Since then—

On the Point Douglass and St. Louis river road.—A bridge of three spans, each of twenty-five feet, has been made over Sunrise river; and the contract of John D. Ludden, esq., for the portion between the sixty-eighth and seventy-eighth mile stations, has been reported to me finished. The expenditures on account of this road from the 30th of June last year have been $16,618 47.

On the Point Douglass and Fort Ripley road.—The bridge across Rum river, represented in my last report as nearly completed, has been finished. This bridge is one of a single span, of one hundred and thirty-seven and a half feet, and is elevated twenty-four feet above the water at its ordinary level. It has been constructed according to the plan of the improved brace bridge of Colonel Long, of the Topographical Engineers, and in the precision of its joints, the complete manner in which its parts have been compacted together, and its unyielding stiffness as a whole, it is all that could be desired. So well was it put together, and so judiciously were the joints arranged, that when the scaffolding was taken away it was found to have settled only half an inch. My assistant in the erection of this bridge was Charles L. Emerson, esq., civil engineer, and the contractor Orrin W. Rice, esq., to both of whom I tender my acknowledgments for the faithful manner in which they have performed their respective duties. The amount expended on account of this road since June 30th had been $7,315 87.

On the Wabasha and Mendota road.—The contract of F. S. Richards, esq., mentioned in my last report as in process of completion, has been finished. The portion covered by this contract includes the bridge of thirteen spans, each of twenty-five feet, with its embanked approaches, over the slough near Wabasha; a small bridge over Smith creek, with its approaches; the grading of the adjoining hills; and the construction of the portion of the road alongside of the bluff of the Mississippi river just above Reed's Landing, and the continuation of it on through the ravine back of Racot's to the table land above. These several portions of work, especially the first and the last mentioned, were very heavy in their character, and required an outlay of money greatly disproportionate to what will be required on the road generally. There yet, however, remains a couple of formidable pieces—the causeway over Hay Creek marsh and the bridge over Canon river and bottom, the latter of necessity nearly half a mile long—which will also cause a disproportionate outlay. The amount expended on account of this road since June 30th has been $5,980 40.

Having now given a statement of the operations during the past year, I proceed to lay before you a detailed statement of all the work which has been done on all the roads under my charge since the date of the first appropriation for them by Congress, July 18, 1850, and I forward herewith a map, the better to illustrate the report:

Road from Point Douglass to the mouth of the St. Louis river of Lake Superior in Wisconsin.—This road has been surveyed and staked out from Point Douglass to the falls of the St. Louis river, the most northern terminus, according to the acts of July 18, 1850, and January 7, 1853; and has been constructed from mile station 21 to mile station 78, a distance of fifty-seven miles; three-fourths of the distance being through dense heavy woods, and a considerable portion of it involving some deep and difficult cutting and the construction of a large number of culverts and bridges, two of the latter, that over Deep ravine, near Stillwater, and that over Sunrise river, being of a considerable character. I have stated that the road has been surveyed and staked out from Point Douglass to the *falls* of the St. Louis river, the northern terminus, according to the acts of July, 1850, and January, 1853. But a more recent act—that of July last—provides that so much of any former act as requires the road to terminate at the *falls* or rapids of the St. Louis river be repealed, and makes the *mouth* of the St. Louis river, in Wisconsin, the terminus. This being the case, the survey and location of the road will have to be extended from the *falls* of the St. Louis river, or from some *point north of the already constructed portion of the road*—that is, from some point north of mile station 78—to the *mouth* of that river, in one of the modes suggested by my letter of the 17th August, as the department may direct. Besides this survey and location, which it is proposed to have done under the recent appropriation of $20,000, it is also proposed, agreeably to the sanction of the department, to make this appropriation go as far as possible towards opening the road through to Lake Superior, and making it passable. In order to this, the road will be simply cut through, and, if necessary, grubbed to a width, say eighteen feet, just sufficient to enable teams to pass;

the bridges, culverts, and causeways be made well where required; and, after getting through in this way, it is proposed to go over the road again, widen, grub, and otherwise perfect it, as the means appropriated by Congress will allow.

Road from Point Douglass to Fort Ripley.—This road has been surveyed and staked out its entire length; the portions which have been constructed are as follows: The portion between stake 21, just beyond Rice creek and mile station 21, a distance of nearly five miles, inclusive of a bridge of two spans, each 25 feet over Coon creek, with its embanked approaches; a bridge of a single span of 137½ feet over Rum river, with its embanked approaches; a bridge of five spans each of 25 feet over Elk river, with the necessary embankment; the portion between mile station 65 and mile station 82, a distance of 17 miles; a bridge of three spans each of 25 feet over Rock creek, with its embanked approaches, the portion between mile station 101 and and mile station 105, a distance of four miles; and the portion between mile station 113 and mile station 115, a distance of two miles. The portion, proposals for which have been advertised under the recent appropriation of $10,000, are the portion extending from Dayton's bluff, below St. Paul, to the town, over a difficult marsh, subject to be overflown by the back water of the Mississippi, and the portion extending from St. Paul to St. Anthony, a distance of seven and a quarter miles*—both of them heavy works. The balance which may remain of the appropriation will be applied to such other portions of the roads as may most require it.

The road from mouth of Swan river to the Winnebago agency, at Long Prairie.—This road has been surveyed and staked out throughout its whole extent. The portions constructed are, commencing at its western terminus or the agency, as follows: A bridge of 20 feet span and a causeway across Turtle creek and marsh, the portion between miles stations 3d and 7th, a distance of four miles; a bridge of 30 feet span over Bear Head creek, with its embanked approaches; a bridge of 25 feet span over Swan creek, with the necessary embankments; two bridges, each of four spans of 25 feet, over Swan river, with the embanked approaches; and the portion between the 25th mile station and the Mississippi river, a distance of nearly three miles. The recent appropriation of $5,000 it is proposed to apply next spring, as the former ones have been, to the portions of the road where it will be most required.

Road from Wabasha to Mendota.—This road was surveyed and staked out in the fall and *winter* of 1851, but the work proving abortive on account of the time in which it was done, I was necessitated in the summer of 1853 to have it surveyed and staked out again. The portions completed are the bridge of thirteen spans, each of 25 feet, and causeway over the slough at Wabasha, a small bridge over Smith's creek, with its approaches, the grading of the adjoining hills. The construction of the portion of the road extending from Reed's landing

* This last portion has to-day, September 19th, been under contract.

along the side of the bluff of the Mississippi, and through the ravine back of Raucot's to the table land above, and the construction of the portion of road extending from the table land above, down along the side of the river bluff at Mendota to the beach below. The recent appropriation of $15,000 it is proposed to apply to the construction of a causeway and the necessary bridges across Hay Creek marsh, and the construction of a bridge over Cannon river and bottom, (both of them very heavy works,) and the balance wherever most needed on the road.

For all these roads I find that, in consequence of my having taken the costs of the roads built by the general government in Wisconsin as a basis, when the standard of excellence to which they have been worked has been higher, the leaving in margin of profit to the contractor, and the underrating in some degree the cost of labor in the distant and more inaccessible parts of the roads, I have underrated the cost of their completion. Taking, then, the data which have been furnished me by the contracts which have been already completed as a basis, I estimate the balances necessary to be appropriated in order to the completion of the roads, exclusive of the appropriations which have already been made, as follows:

For the road from Point Douglass to the mouth of the St. Louis river	$50,639 00
For the road from Point Douglass to Fort Ripley	18,190 00
For the road from the mouth of Swan river to the Winnebago agency, at Long Prairie	3,653 00
For the road from Wabasha to Mendota	19,434 00
Total amount required	91,916 00

Road from Mendota to the mouth of the Big Sioux river.—Having but recently been entrusted with the general superintendence of this road, and all the arrangements for its progress not having as yet been matured, I can say nothing more than when I am put in possession of all the maps and estimates in relation to it, I shall lose no time in applying the recent appropriation of $20,000 in the mode required by the department. No further estimates are made for it for the reason that by the recent act the amount appropriated, according to the decision of the department, is to *complete* the road.

In regard to *the importance of completing all these roads in the shortest period possible*, there is not the slightest question. In order that this may be seen more clearly, I will repeat what I have said in former reports on this subject, making, however, such additional remarks as may be required by the present condition of the roads.

The Point Douglass and St. Louis river road is of the utmost consequence, in the accommodation it will afford to the lumber interest high up the St. Croix, upon Snake river, and Kettle river, and their tributaries; this road being the only avenue, especially in the winter, by which supplies can be transported to these points for the maintenance of those engaged in the trade. During every other season except the

winter these supplies, in consequence of the utter impassability of the roads on account of swamps, and marsh, and rich, moist, shaded soil, have to be boated up swift streams, where the boatmen, in addition to the weariness of poling against a strong current, have not unfrequently to contend against formidable rapids and falls by resorting to portages around them. At present the road is available for travel at every season, from its northern terminus to the 79th mile station, just beyond Sunrise river. But beyond this, as far as Pokigoma, a distance of 21 miles, only a narrow way has been cut out, which, on account of swamp and marsh, can only be used in winter; and from Pokigome to the terminus of the road, a distance of about 90 miles, there is not as much as a well defined trail upon which a man on horseback can travel.

But there are other and very important reasons why this great thoroughfare should be opened. It is the grand connecting link between the head of navigation on the great northwestern lakes and the head of navigation on the upper Mississippi; and it only remains for this avenue of communication to be made to at once open to market the extensive mineral and fishing interests of the great Lake Superior region. Nor is this all. Its extensive bearings and connexions with the great centres of trade at the east, by means of water and railroad communications, (and which are about to be perfected by the ship-canal around the falls of St. Mary,) and with the south and west by means of the Mississippi, make it certain that this road is destined to bear a mighty tide of travel and commerce upon it.

The Point Douglass and Fort Ripley road runs through a portion of the Territory to which emigrants are flocking in considerable numbers. It is the great highway by which the government supplies reach the Indians in the Winnebago territory and in the Chippewa district. It is also the road by which the government supplies are transported to the troops at Fort Ripley.

The Swan river and Long Prairie road is a branch road from the Point Douglass and Fort Ripley road, and is the one by which the government supplies are conveyed to the Winnebago agency at Long Prairie.

The Wabasha and Mendota road is the road by which supplies—in the fall and spring, when the steamboats cannot get up the Mississippi any further on account of ice in Lake Pepin—are carried from the foot of the lake to the towns above. It is also a link in the great highway of travel and commerce from Iowa to St. Paul—a highway which must always, on account its being so much shorter, be preferred to the parallel points on the east side of the Mississippi.

But, in addition to all the reasons I have adduced in favor of an early completion of the road referred to, the great one of developing the resources of the country is yet to be stated. The Territory of Minnesota is, as I believe, peculiarly the land for health, enterprise, and enjoyment, and, as such, in connexion with its genial soil, is destined to become the *El Dorado* of all who to a good soil wished to see conjoined a pure bracing atmosphere and beautiful and variegated

scenery. How important, then, that on these, as also on the other accounts mentioned, these roads should be opened at the earliest possible period.

All of which is respectfully submitted.

J. H. SIMPSON,
Captain Corps Topographical Engineers.

Col. J. J. ABERT,
Chief of Corps of Top. Engineers, Washington, D. C.

OFFICE GENERAL GOVERNMENT ROADS, TERRITORY MINNESOTA,
St. Paul, October 10, 1854.

SIR: In reviewing my annual report of September 15, I perceive that in my estimate of the balance which will be necessary to complete the Point Douglass and St. Louis river road, I have left out the additional amount which will be required to extend the road to the mouth of the St. Louis river, as required by the recent act of Congress. Inclusive of all expenses of surveys, engineering, and construction, I estimate this additional cost, the distance being, say 25 miles, at $15,000. The total amount required, then, to complete the whole road from Point Douglass to the mouth of the St. Louis river, over and above what has been already appropriated, I estimate at $65,639.

I respectfully request that this statement may be considered a part of my annual report.

I am, sir, very respectfully, your obedient servant,

J. H. SIMPSON,
Captain Corps Top. Engineers.

Col. J. J. ABERT,
Chief Corps Top. Engineers, Washington, D. C.

REPORT OF THE CHIEF OF ORDNANCE.

ORDNANCE OFFICE,
Washington, October 24, 1854.

SIR: The principal operations of the Ordnance Department during the last fiscal year, arranged in order under their respective heads, are respectfully reported as follows:

Funds.

Amount undrawn from the treasury on the 1st July, 1853, as per last year's report	$263,077 26
In hands of disbursing officers, same date	255,078 25
Amount of appropriations for the fiscal year 1853–'54, including the fixed annual appropriation for arming and equipping the militia	1,000,665 00
Received during the year for damages to, and losses of, arms, &c., in hands of troops, chargeable to them, and from all other sources not before mentioned	97,346 00
	1,616,166 51
Amount of expenditures during the year	993,103 74
In hands of disbursing officers, 30th June, 1854	170,807 90
Remaining in treasury, undrawn, 30th June, 1854	452,254 87
	1,616,166 51

The amount expended during the year from each appropriation will be found stated under the respective heads as they occur. The accounts of all the disbursing officers have been regularly forwarded to, and examined in, this office, and transmitted to the proper accounting officer of the treasury for settlement, excepting those of the officer at Monterey, California, to the non-reception of which his attention has been called, and which he attributes to the failure of the mails from that place. Measures have been taken to secure their regular transmission hereafter. The estimates for the next year have been prepared with care, and with as much regard to economy as is consistent with a proper provision for the wants of the public service.

Armament of fortifications.

The principal articles procured for the armament of fortifications by purchase and fabrication from the foundries and arsenals are as follows, viz.:—

31 10-inch columbiads.
14 8 do do
7 10 do do barbette carriages.
28 8 do do do do

6 32-pounder barbette carriages.
52 24 do do do
16 32 do casemate do
15 24 do howitzer carriages for flank defence.
8 24 do barbette chassis.
7 32 do casemate do
5 10-inch columbiad upper carriages.
240 10 do shot.
300 8 do do
822 10 do columbiad shells.
1,654 8 do do do
6,750 cartridge bags, different calibres.
6,790 cubic feet of timber for sea-coast carriages.

There are orders out, not yet executed, for more of the heavy columbiads and their projectiles, and also for supplies of carriage timber for this description of cannon. These, with other orders to be given, but temporarily delayed to await the action of the Board on the armament of fortifications, will probably absorb the unexpended balance of the appropriations for this object. This department has also, under this branch of its duties, repaired and kept in order the armament of the several forts in the country, supplied the fortifications in the harbor of San Francisco with a portion of their armament, and sent to the Rio Grande the garrison guns requisite for the forts on that frontier. The expenditures on that account during the fiscal year have amounted to $106,332 27. The measures which have been pursued for some years past to improve the quality of cast iron cannon, and to apply tests of strength and endurance more reliable than the mere powder proof, have resulted satisfactorily. Reports, in detail, of the methods which have been pursued, and the experiments which have been instituted and carried out for this object, as also of those for the improvement of small arms, will be submitted as soon as they can be properly arranged, and the drawings requisite for their proper illustration can be prepared. They are believed to be of sufficient interest and value to warrant their publication for general distribution, particularly those in regard to cast iron, which will prove valuable not only to cannon-founders, but to all who are engaged in manufactures into which that material enters. They will, accordingly, be prepared and presented with that view.

The superiority in range and accuracy of fire of elongated balls, fired from grooved or rifled barrels, has induced investigations in relation both to the most advantageous shape of the ball and the best mode of grooving the arm. Some experiments in regard to both these points have been made with the service rifle, and it is intended to prosecute them further, and to apply them also to the musket. Two of these arms have been prepared for the purpose, with their barrels grooved on different plans, but they have not been tried. The experiments which have been made are not yet complete; but so far as they have gone, the results indicate that considerable improvement over the present mode of grooving our service rifles may be made, both in the facility of loading and the accuracy of fire with elongated balls. In the expe

riments which have been made the best results were obtained from a ball of the same exterior shape as the French ball for the "*à la tége*" arm, but differing from it, and also from the Minnie ball, in being so made as to expand by the force of the charge of powder without the aid of an iron culot or cup in the end; or, in other words, a simple, instead of a compound expanding ball. This ball gave more accurate firing at the same distances than the Pritchett (English) ball of the same diameter. The French balls, of the firing with which we have any reports, are of greater diameter and weight, and the same comparison with them cannot be made.

Of the several modes of grooving tried, varying from each other in the number of grooves and in the relations between the grooves and the lands, the best results have been obtained from the five grooved bore, with lands and grooves equal, and the grooves of circular arcs with a depth of two-hundredths of an inch. Those which have been tried are seven, five, and three grooves, with lands and grooves equal, and five broad grooves with narrow lands. In all these trials the depth of the grooves from the breach to the muzzle was uniform; but there is reason to suppose that an improvement in this respect may be made by having grooves of a decreasing depth from the breach, becoming shallow at the muzzle, whereby the ball will leave the piece with less expansion. The want of a proper machine for this kind of grooving—but which there will be found little difficulty in obtaining—has prevented any trials of this plan so far. Indeed, the necessity of doing the new kinds of grooving by hand (machinery being adapted only to a special mode) has retarded the preparations for experiments, while their execution has been similarly affected by the removal of army officers from public armories.

The results stated to have been obtained in foreign services, and those derived from our own limited experiments, indicate so great a superiority of the rifled bore with the elongated expanding ball, that it seems not improbable that the use of smooth-bored arms and spherical balls may be entirely superseded. This will render it necessary to institute and carry out experiments to ascertain whether it will be possible to adapt our present musket to the safe and easy use of the elongated ball, and if not, to find out what is the calibre and model of arm best calculated to take its place as a military weapon for the general service of infantry. Such experiments it is intended to have made as soon as practicable. In the meantime it is manifestly inexpedient, with our present stock of some half million of smooth bored arms, to go on increasing the supply of arms of this model. The manufacture should be suspended until our own experiments, or decisive results of the trials in actual warfare now going on, may settle the question as to the kind of weapon that will be hereafter used.

Ordnance, ordnance stores, and supplies.

The principal articles under this designation, which have been procured by purchase and fabrication at the arsenals, are as follows, viz:

40 siege guns of different calibres.
6 eight-inch siege howitzers.

28 bronze field guns of different calibres.
33 bronze field howitzers do. do.
25 field carriages.
12 caissons.
10 traveling and portable forges.
2 battery wagons.
1,076 shot and shells of different calibres.
50 Sharp's carbines.
910 swords and sabres.
10,097 infantry cartridge boxes.
7,855 do. cartridge box belts.
7,443 do. bayonet scabbards, with frogs.
13,875 do. gunslings.
5,025 do. waist belts.
28,163 cap pouches and cone picks.
442 rifle pouches.
304 flask and pouch belts.
660 rifle cartridge boxes.
297 sword shoulder belts.
3,074 carbine cartridge boxes.
267 pairs of holsters.
885 sabre knots.
1,834 spherical case shot, different calibres.
10,066 pounds of canister shot do.
5,182 stands of fixed ammunition for field service.
675 stands of ammunition for siege and garrison services.
722,493 cartridges for small arms.
217,500 percussion caps for small arms.
614,000 Maynard's primers.
4,000 friction primers for cannon.
5,900 cubic feet of timber, for siege and field carriages.

The expenditures from this appropriation during the fiscal year amounts to $230,978 73.

The quantities and kinds of arms, ammunition, and other ordnance supplies issued for the United States service during the same period are mentioned in statement C, hereto annexed.

National Armories.

The expenditures at these armories during the fiscal year have been as follows, viz:

	Harper's Ferry.	Springfield.	Total.
Manufacture of arms, appendages, tools, &c., and purchase of materials for the same.....	$111,672 58	$145,776 67	$257,449 25
Repairs, improvements, and new machinery..	60,023 04	9,547 41	69,570 45
	171,695 62	155,324 08	327,019,70

The manufactures at Harper's Ferry include 9,000 percussion muskets and 2,761 percussion rifles, with 26,098 appendages for the same, consisting of extra cones, wipers, spring-vices, screw-drivers, ball screws and bullet-moulds; also 13,153 hammers and screw-drivers for percussioning muskets, and 10,653 assorted components for issue to other posts for the repairs of arms. At Springfield armory the manufactures include 11,000 percussion muskets and 2,000 cavalry musketoons, with 89,374 appendages, consisting of like parts with those before mentioned. The cost of the finished musket at Springfield armory during the year, is reported at $10 61, and at Harper's Ferry at $11 98; that of the finished rifle with steel barrel is stated to be $12 32. The operations at the armories during the year are stated in detail in the reports of their commanding officers hereto annexed. Since the close of the year the charge of the national armories has been taken from officers of the army and given to civilians, in compliance with law.

Arming and Equipping the Militia.

The amount of expenditures, during the fiscal year, from this appropriation, was $156,145 43. The principal articles procured on this account by purchase and fabrication were:

5 prairie carriages.
12 caissons.
1,900 rifles and appendages.
4,000 cavalry pistols and appendages.
1,000 Colt's pistols and appendages.
690 cavalry sabres.
1,000 horse artillery sabres.
500 artillery swords.
9,941 infantry cartridge-boxes.
10,183 infantry cartridge-box belts.
15,304 infantry waist belts.
6,608 infantry bayonet scabbards and frogs.
11,413 gun-slings.
1,333 cap-pouches.
324 sword shoulder belts.
2,000 copper powder-flasks.
636 rifle-pouches.
1,650 flask and pouch belts.
3,000 rifle cartridge-boxes.
1,030 cavalry sabre belts.
236 pairs of holsters.
569 sabre knots.
300 horse artillery sabre belts.
600 artillery sword belts.
160 pistol cartridge boxes.
13,000 percussion caps.

The apportionment of arms and the supplies furnished to the militia during the year are shown in the statements A and B hereto annexed. I respectfully renew the recommendation, heretofore frequently made,

and which experience has shown to be requisite for the apportionment to each State and Territory of its proper and just quota, of a change in the present law, so as to adopt for all the States and Territories the mode of apportionment authorized for the State of Iowa by the act of 3d March, 1853, which was according to representation in Congress.

Arsenals and Depots.

The expenditures from the appropriation for arsenals, during the last fiscal year, amount to $63,684 54. The work done under this head includes repairs and preservation of public buildings, fences, wharves, &c., the erection of new and additions to old buildings, and all improvements of a permanent character. The reports of the commanding officers of the principal arsenals, hereto annexed, give detailed statements of the chief operations at each. The whole number of arsenals and depots, which have been in use during the year, are twenty-six; one of which has lately been broken up, and the site directed to be sold.

During the last session of Congress the inquiry was made as to the expediency of ceding the arsenal near St. Louis to that city, on which subject a special report was made from this office, dated January 27, 1854. As this matter may be again brought up for action, I refer to that report as containing the only conditions on which the cession can be made without very great injury to the public service and interest. The estimate there made for erecting an arsenal on the public reservation near Jefferson Barracks, and the removal of the ordnance stores, should be increased to $300,000. The whole of this amount will probably be required to place the arsenal and public supplies in as serviceable a condition as before the cession, and it is but little, if any, more than a third of the present value of the land alone which it was proposed to cede to the city.

I have included in my estimates for the next year the means for establishing arsenals in Texas, New Mexico, and Oregon, and for continuing the construction of the arsenal in Benicia as soon as a satisfactory title to the site can be obtained. The want of such title has prevented the expenditure of the appropriation for the Benicia arsenal, made at the last session of Congress; but it is expected that the title will be secured sufficiently early to allow the advantageous application of that sum, and also the amount of the present estimate, before the close of the next year. The necessity for these arsenals is stated in the remarks appended to my estimate therefor.

The exclusion of the enlisted men of ordnance (the only enlisted men in the army so excluded) from the benefits of the act to increase the pay of the rank and file of the army, is so manifestly unjust towards them, and so evidently the mere result of the phraseology of the act, and contrary to its spirit and intent, that a reference to it is supposed to be sufficient to insure its correction by explanatory legislation. As there is no conceivable reason for excluding this portion of the rank and file of the army from the benefits conferred on all the rest, I trust that the attention of the legislature will be called to it, and that a declaratory act will be passed including the enlisted men of ordnance

in the provisions of the act "to increase the pay of the rank and file of the army and to encourage enlistments," from its date.

A. K. CRAIG, *Colonel of Ordnance.*

Hon. JEFF'N DAVIS,
Secretary of War.

A.

Apportionment of arms to the militia for the year 1853, *under the act for arming and equipping the whole body of the militia.*

States and Territories.	For what years returns received.	Number of militia.	Number of arms apportioned in muskets.
Maine	1853	55,713	313
New Hampshire	1853	33,576	189
Massachusetts	1853	140,456	789
Vermont	1843	23,915	134
Rhode Island	1853	15,972	90
Connecticut	1853	60,844	342
New York	1853	311,313	1,749
New Jersey	1852	81,984	461
Pennsylvania	1847	276,070	1,551
Delaware	1827	9,229	52
Maryland	1838	46,864	263
Virginia	1853	125,217	704
North Carolina	1845	79,448	446
South Carolina	1848	55,209	310
Georgia	1850	78,699	442
Florida	1845	12,122	68
Alabama	1851	76,662	431
Louisiana	1851	53,230	299
Mississippi	1838	45,385	255
Tennessee	1840	71,252	400
Kentucky	1852	88,858	499
Ohio	1845	176,455	992
Michigan	1852	64,669	363
Indiana	1832	53,913	303
Illinois	1851	170,359	957
Wisconsin	1853	46,760	263
Iowa*	.....	.....	195 5-13
Missouri	1844	61,000	343
Arkansas	1843	17,137	96
Texas	1847	19,766	111
California	1853	201,400	1,132
Minnesota Territory	1851	2,003	11
Oregon Territory	No return.	.....	.....
Washington Territory	No return.	.....	.....
Territory of Utah	1853	2,821	16
Territory of New Mexico	No return.	.....	.....
District of Columbia	1852	8,201	46
		2,566,502	14,615 5-13

* According to 2d section of act of March 3, 1853.

A. K. CRAIG, *Colonel of Ordnance.*

ORDNANCE OFFICE,
Washington, October 24, 1854.

B.

Statement of the ordnance and ordnance stores distributed to the militia under the act of April, 1808, from 1st July, 1853 to the 30th June, 1854.

2 6-pounder iron guns.
2 12-pounder bronze guns.
30 6-pounder bronze guns.
1 12-pounder mountain howitzer.
12 carriages for field artillery, with implements and equipments complete.
1 caisson with tools and spare parts.
13 sets of artillery harness for two wheel horses.
10 sets of artillery harness for two lead horses.
40 leather traces for wheel horses.
40 leather traces for lead horses.
16 leg guards.
28 artillery whips.
8 nose bags.
6 cannon locks.
2 valises and straps.
8 6-pounder sponges and rammers.
1,799 muskets and appendages.
20 cadets' muskets and appendages.
1,496 rifles and appendages.
151 carbines and appendages.
40 cavalry musketoons and appendages.
40 percussion, (Hall's) rifles.
1,310 percussion pistols and appendages.
10 Colt's pistols and appendages.
698 cavalry sabres.
290 horse artillery sabres.
41 non-commissioned officers' swords.
100 musicians' swords.
50 cadets' swords.
4,611 sets of accoutrements, for infantry, riflemen, and cavalry.
540 infantry cartridge boxes.
500 infantry cartridge box belts and plates.
1,100 infantry waist belts and plates.
1,000 bayonet scabbards and frogs.
1,500 cap pouches and picks.
420 rifle pouches.
420 flask and pouch belts.
420 copper powder flasks.
131 sword shoulder belts.
688 cavalry sabre belts.
215 horse artillery sabre belts.
645 pairs of holsters, with caps.
115 sabre knobs.
75 pistol cartridge boxes.
39 carbine slings.
39 carbine swivels.
40 carbine buckets.

300 artillery sword belts.
500 musket screw-drivers.
90 rounds of fixed ammunition.
6,000 cartridges for small arms.

A. K. CRAIG,
Colonel of Ordnance.

ORDNANCE OFFICE,
Washington, October 24, 1854.

C.

Ordnance and ordnance stores issued to the army, and to the several military posts, for the year ending June 30, 1854.

16 24-pounder guns.
8 12-pounder bronze guns.
11 6-pounder bronze guns.
2 32-pounder bronze howitzers.
2 24-pounder bronze howitzers.
5 12-pounder bronze howitzers.
4 mountain howitzers.
10 10-inch columbiads.
34 8-inch columbiads.
4 10-inch siege mortars.
10 8-inch siege mortars.
4 24-pounder barbette carriages.
10 10-inch columbiad barbette carriages.
34 8-inch columbiad barbette carriages.
12 24-pounder seige carriages.
4 10-inch mortar beds.
10 8-inch mortar beds.
8 12-pounder carriages.
16 6-pounder carriages.
2 32-pounder howitzer carriages.
2 24-pounder howitzer carriages.
28 caissons.
4 battery wagons.
7 travelling forges.
102 24-pounder cannon balls.
300 10-inch cannon balls.
1,050 8-inch cannon balls.
1,220 10-inch columbiad and mortar shells.
3,000 8-inch columbiad shells.
3,859 stands of ammunition for field service.
7,970 stands of ammunition for siege and garrison service.
1,378 muskets and appendages.
86 rifles and appendages.
219 cavalry pistols and appendages.
10 Colt's pistols and appendages.
357 musketoons and appendages.
232 cavalry sabres.

95 artillery sabres.
54 artillery swords.
94 non-commissioned officers' swords.
53 musicians' swords.
536 sets of infantry accoutrements.
176 sets of rifle accoutrements.
1,232 infantry cartridge boxes.
914 cartridge box belts.
1,240 bayonet scabbards.
1,082 waist belts.
1,121 cap pouches and picks.
995 gun slings.
132 sword shoulder belts.
241 sabre belts.
207 carbine slings and swivels.
220 sabre knots.
443 carbine cartridge boxes.
54 artillery sword belts.
19,070 cartridge bags, for siege and garrison service.
5,326 cartridge bags, for field service.
214,000 cartridges, for small arms.
5,300 pounds cannon powder.
400 pounds rifle powder.
7,100 cannon primers.
950 friction primers.
9,972 priming tubes.
215 portfires.
1,550 pounds of paint.
153 pounds of tallow.
334 gallons oil.
81 gallons coal tar.
34 pounds beeswax.

A. K. CRAIG,
Colonel of Ordnance.

ORDNANCE OFFICE,
Washington, October 24, 1854.

SPRINGFIED ARMORY, COMMANDED BY BREVET LIEUTENANT COLONEL J. W. RIPLEY.

Statement of the principal operations at the armories and arsenals during the year ending June 30, 1854.

The principal operations at this armory during the year were as follows:

Fabricated.

10,000 percussion muskets, including three adapted to the Maynard primer.
2,000 cavalry musketoons.
23,892 cones, extra.
20,206 wipers.

13,331 screw-drivers.
17,096 hammers.
6,970 ball screws.
7,879 spring vices.
563 arm chests.
11 packing boxes.

Machinery fabricated and in progress.

1 milling machine, completed.
1 machine for twisting wipers completed.
1 shaving machine, still in progress.

A large amount has been expended for repairs of tools and machinery, leaving them at the end of the year as valuable and efficient as, if not more so, than they were at its commencement.

Buildings.

The repainting of the public buildings on the hill, in progress at the time the last report was made, was continued and completed during the last season. Since that report one of the arsenals, the office building, and the shops have been repainted and furnished with lightning rods; the cupola of the office new roofed, &c., and the tin roof of the forging, steam, and machine shop, which was partially blown off by a gale, has been repaired.

Grounds.

The grounds west of the new arsenal have been repaired, and the embankments secured against heavy rains, &c.

HARPER'S FERRY ARMORY, COMMANDED BY MAJOR W. H. BELL.

The principal operations at this armory were as follows:

Musket factory.—Arms and appendages fabricated.

9,000 percussion muskets, model 1842, complete.
10,973 cones, extra.
2,755 wipers.
1,065 spring vices.
5,256 hammers for percussioning flint-lock muskets.
7,897 screw-drivers do do do.
9,652 components, assorted, for issue to other posts.
5,000 rifle cartridges do do do.
2 swedges for elongated balls do do.

Machinery fabricated and in progress.

1 machine for bending wipers, half done.
2 lathes for turning barrels, repaired and improved.
2 regulators for water-wheels, do do.
1 machine for banding stocks, do do.
3 trip-hammers for screws and barrels, do do.
1 drilling-machine, three spindles, fabricated.
1 lathe for turning iron, large, purchased and being fitted up.
1 do do hand, do do do.
8 new cutting machines, do do do.
1 large force pump for throwing water in case of fire, completed with all its machinery, connected with the water-wheel, with cast iron gearing.
1 frame belt tilt hammer, for forging pins, complete.
1 water hydrant on street, established in rear of offices.
1 water-wheel governor, put in position at water-wheel boring mill.

Extensive improvements have been made to the main and counter lines of driving machinery in the first and second floors of bell shop and boring mill, and some new and additional main and counter line put up in the new machine shop and stocking shop.

Many machines transferred and put in position in stocking shop, to facilitate the operations.

Buildings.

New Arsenal.—Foundation for this building nearly excavated. The lumber, cast-iron pillars, window and door frames, and roof irons purchased and delivered.

New rolling mill, 146 by 45 feet, one story of 16½ feet, built of brick, on stone foundation, covered with slate; paved with stone, and having two reverberatory furnaces, with stacks 45 and 40 feet high; two tilt-hammers, one forge, one large lathe for rollers, two train of rollers, 13 and 8 inches; large shears, fan-blower, water-wheel, 15 feet cube, master wheel and gearing, pullies and other machinery, one large cast-iron flume from canal to forebay is now completed, except the two tilt-hammers, part of the pavement, lathe and shears, forebay, part of machinery for driving fan-blower, which is not in position. It is expected that this mill will be ready for operations on or before the first of October next.

Master armorer's quarters, also, the five buildings occupied by the clerks, have been generally repaired, painted and plastered. New kitchen built to master machinist's quarters, principally of old materials; and other repairs. Many of the workshops have been repaired in various respects.

Grounds.

Armory canal at the head, repaired; a wall of 200 feet, 4½ feet high, 3 feet thick, built to prevent wash, and large sand bars removed from the bed of the canal. Lock gates and head gates at the stone forebay improved.

Thirty coal-bins, each about 15 by 17 by 29 feet deep, under trestle

work of Baltimore and Ohio railroad, have been filled in with earth and made suitable for the reception of coal and other stores. Seven of the old buildings occupying reserved ground have been removed, and sold to be removed.

RIFLE FACTORY.

Arms and appendages fabricated.

2,761 percussion rifles, steel barrels, brass mounting.
2,761 cones, extra.
3,109 wipers.
3,105 screw-drivers.
550 ball screws.
685 spring vices.
880 bullet moulds, for round balls.
209 bullet moulds, for conical balls.
1,001 components, assorted, for issue to other posts.
6 bullet moulds, for elongated balls.

Experimental arms.

1 percussion rifle, steel barrel, 32 to the pound.
2 percussion rifles, steel barrels, 24 to the pound.
5 bullet moulds, for elongated balls.
5 swedges, for elongated balls.

Buildings.

New coal house, built of brick, covered with sheet-iron, 21 by 25 feet, one story of 15 feet.

Old forging shop repaired for a stock house, and laid with two new floors.

Machinery fabricated and in progress.

12 feet counter line shafting fabricated and four feet purchased, with new lathe, and put in position.

Governor to water-wheel at barrel drilling shop put up; the main line shafting in machine shop improved.

One large force pump, for throwing water in case of fire, has been put in position, with the required gearing, connected with the water-wheel at the machine shop.

Extensive repairs made to water-wheel and forebays at the finishing shop.

Counter machinery on first floor of barrel drilling shop changed and altered.

Anvil blocks in forging shop altered and improved.

Counter machinery fabricated and put in position in the basement of new machine shop, for lathe for first turning stocks and driving circular saw for cutting stocks to length.

WATERVLIET ARSENAL, COMMANDED BY MAJOR JOHN SYMINGTON.

Report of operations at Watervliet arsenal for the year ending June 30, 1854.

1,007 barrels of powder in magazine overhauled and re-proved.

70,642 small arms, stored in the arsenal, cleaned, oiled, and repacked or boxed.

2 large iron double gates made and hung at the principal entrance to arsenal grounds.

80 rods of wire fencing with wrought iron posts put up; and 4 new lamps for gas lights made, and 6 others altered and set up.

4 lightning rods and poles put up at east magazine.

90,000 feet of gun-carriage and implement timber received, piled, and arranged in timber stores.

Patterns, formers, &c., made for new pattern 8 and 10 inch columbiad barbette carriage and platform.

A new furnace made for heating traverse circles of columbiad platforms, and those for case-hardening and brass casting renewed.

Stone foundation and frame of large timber crane renewed; new eprouvette platform made; canal basin cleaned out and deposite hauled to fill low grounds.

Wood barn on the lower grounds removed and rebuilt near the stables on the grounds west of the canal.

The following repairs and improvements to buildings, &c. made:

Brick Arsenal.—10 double racks, with shelves, put up for arranging stores, a part of them fitted with gas-tarred canvas lining to secure sponges, cartridge bags, &c. from moth.

North Brick Quarters.—Slate roof repaired, (injured by the hurricane of March,) new floors laid in basement, stone steps leading from basement to yard renewed; also, the stone foundation supporting the gallery.

South Brick Quarters.—Plastering in one of the rooms renewed and painted, slate roof damaged by storm repaired.

North Stone Quarters.—Plastering renewed in the hall, slate roof, doors and window-shutters damaged by storm repaired.

South Stone Quarters.—Damaged by fire, caused by defective flue, in January. The main hall and north side rooms from basement up replastered, repainted, and most of the wood-work renewed, including the stairway; the two furnaces and hot-air flues remodeled.

North and South Carriage Stores.—The sheet-iron doors and window-shutters removed and replaced by wood lattices on the iron frames, so as to give better ventilation.

Barracks.—The small lead pipe conducting water from cisterns to barracks taken up and replaced with cast-iron pipe, new alarm-bell hung in east gallery, slate roof damaged by storm repaired.

The following other buildings suffered more or less damage by the storm of March 18 in their roofs, chimneys, doors, shutters, &c., which damages have all been repaired: *Stone arsenal, nitre store, iron store, west magazine, stables, laboratory No. 2, paint shop No. 3, carriage shop*

No. 4, and *machine shop No.* 6. The fences also generally repaired where damaged.

The principal stores fabricated and work executed consist of the following gun carriages, &c.:

24 field caissons.
18 field gun and howitzer carriages.
10 8-inch columbiad barbette carriages.
10 8-inch do. do. chassis.
7 10-inch do. do. carriages.
12 10-inch do. do. chassis.
16 32-pounder casemate chassis.
15 circular platforms for columbiads.
5 platforms for siege carriages.
12 ammunition chests for mountain howitzers.
2 pent-houses for 10-inch columbiads.
3 sling carts, large, with chains, trunnion rings, &c., complete.
1 two-horse wagon.
24 spare wheels for field carriages.
29 do poles do. do.
1 battery wagon, 5 field forges, } Fitted up with tools and spare parts for issue.
23 leading bars for siege carriages.

Artillery Implements and Equipments.

17 sponge buckets, iron, for field guns.
33 do. do. wood, for garrison.
123 tar do. iron, for field.
128 watering do. leather, for field.
100 chocks for siege and garrison carriages.
126 breech sights for garrison guns and columbiads.
90 fuse setters, brass.
16 do. mallets.
43 do. plug reamers.
5 do. do. sets.
8 do. do. taps.
38 do. do. wrenches.
2 gunner's gimlets.
151 do. haversacks.
28 do. pouches.
12 do. levels.
30 do. quadrants, wood.
7 muzzle lights.
6 splints.
20 quoins for siege carriages.
36 pass-boxes.
152 linstocks.
92 lock and vent covers.
68 vent punches.
32 loading tongs.
90 tow-hooks.

205 tarpaulins, 12 by 15 feet.
19 do. 5 by 5 do.
264 tube pouches.
36 tangent scales for field guns.
15 pendulum hausses for field guns.
52 prolonges for field carriages.
402 lanyards for cannon locks and primers.
116 trail handspikes for field carriages.
410 handspikes, garrison and manœuvring.
44 do. truck, for columbiads.
1 lifting jack.
51 tompions for siege howitzers and columbiads.
11 elevating bars for columbiads.
145 blocks and rollers and skids, assorted.
76 chocks, assorted.
1 garrison gin-fall, with collar and stakes.
1 single fall.
8 double and single prolonges for mechanical manœuvres.
88 lashing lines and cords for do. do.
6 sling and trace ropes for do. do.
42 wrenches for columbiad carriages.
160 rammers and staves for garrison guns and columbiads.
245 sponges and staves for do. do. do,
190 do and rammers do. do. do.
198 sponge covers, for garrison and columbiad implements.
232 sponge covers, for field and siege implements.

Ammunition.

475 shells and spherical case shot, strapped for siege guns.
611 rounds grape and canister shot, for siege guns.
440 rounds shot, shells, and canister, fixed for field guns.
26 cannon wads, for proving columbiads.
1,127 cannon cartridges, assorted.
10,893 cartridge bags, for garrison guns and columbiads.
7,998 priming tubes.
12,748 priming tubes, empty.
2,940 8-inch fuses, wood.
9,242 paper fuses, for garrison guns.
1,525 brass fuse-plugs, for 10-inch columbiads.
3,800 brass fuse-plugs, for 8-inch columbiads.
3,777 wood fuse-plugs, for siege guns.
119 canister tops and bottoms, for garrison guns.
27 canisters, for garrison guns.
267 grape shot bolts, for garrison guns.
347 grape shot rings, for garrison guns.
7,905 sabots, assorted, for field ammunition.
3,506 sabots, for 8 and 10-inch columbiad shells.
981 cartridge blocks, for field ammunition.
6,765 cartridge blocks, for 8 and 10-inch columbiad shells.

Artillery harness.

9 sets, complete, for 2 lead horses.
270 nose bags.
252 whips.
151 bitts, curb, plated.
12 breechings.
72 belly-bands.
88 collars.
16 girths.
36 halters.
27 billets.
20 leading reins.
165 pairs brass stirrups.
123 hame straps.
65 breast and hip straps.
160 traces, leather, wheel and lead.

Miscellaneous.

8 fencing bayonets.
2,850 cap pouches.
1 gauge ring for 10-inch shells.
8 gauge fuse holes, for shells.
295 pounds mixed paint.
20 pounds soft solder.
8 pairs moccasins.
598 packing boxes.

Altered or repaired.

3,407 cannon cartridges.
1,870 rounds of ammunition, for field guns.
332,600 cartridges, for small arms.

ALLEGHENY ARSENAL, COMMANDED (TEMPORARILY) BY LIEUTENANT T. J. RODMAN.

The principal operations at this arsenal during the year were as follows:

Articles fabricated.

12 6-pounder field carriages.
2 travelling forges.
2 battery wagons.
41 iron sponge buckets.
94 wooden sponge buckets.
80 iron tar buckets.

15 wooden water buckets.
59 fuse-plug receivers.
2 gunner's callipers.
72 gunner's gimlets.
15 gunner's haversacks.
44 gunner's pincers.
69 trail handspikes.
97 manœuvring handspikes.
68 nose-bags.
320 driver's whips.
22 lanterns, assorted.
59 lock covers.
118 priming wires.
68 sponge covers.
16 sponges and staves.
5 tangent scales.
2 tarpaulins, small.
150 thumbstalls.
154 tow-hooks.
60 vent punches.
28 worms and staves.
19 10-inch oakum wads.
11,954 infantry cartridge boxes.
10,950 do. do. do. plates.
5,414 do. do. do. belts.
7,620 do. do. do. do. plates.
9,171 bayonet scabbards with frogs.
16,050 gun-slings.
5,075 infantry waist belts.
5,070 do. do. plates.
27,033 cap pouches and cone picks.
1,078 rifle ball pouches.
954 rifle pouches and flask belts.
1,890 rifle waist belts.
1,890 rifle waist belt plates.
3,734 rifle and carbine cartridge boxes.
160 pistol cartridge boxes.
4,957 rifle and cavalry cartridge box plates.
300 artillery sabre belts.
503 pairs of holsters.
480 soft leather caps.
727 sword shoulder belt plates.
950 sergeants' and musicians' waist belts.
9,100 do. do. do. plates.
773 sabre belts.
1,454 sabre knots.
42 10-inch (proof) cartridges.
212 6-pounder (proof) do.
Fire-works for celebrating the anniversary of national independence.
109 boxes for battery wagon stores.
24 field carriage fellies.

10 splinter bars.
40 spokes for field carriages.
5 6-pounder stocks, (ironed.)
14 caisson and 9 battery wagon stocks, ironed.
1 artillery saddle, Grimsley's pattern.
18 do. bridles, do. do.
12 brass plated bridle belts.
6 horse collars.
48 saddle girths.
6 halters.
25 hame straps.
20 leather traces and 20 valises.
100 pounds wrought and horse-shoe nails.
18 jackscrews, and a large number of battery wagon stores and tools.
556 packing boxes, and tools, &c., for current service.
2 10-inch sponges and staves.
1 coal box, 1 burnisher, 1 fire bucket.
2 turning chisels, 1 tin can.
20 formers, (cast iron.)
6 moulder's flasks, (cast iron.)
1 lens and mirror.
21 patterns for castings, and several other articles made for the current service of the post.

Other work done.

1,185 flint-lock pistols altered to percussion.
151,000 ball and buck shot, flint-lock musket cartridges, altered to percussion.
160 feet of work-benches, made.
56 cutting boards, made.
13,840 muskets cleaned, &c.
211 square yards of paved gutter, and,
148 lineal feet of barrel sewer made.
10 perches of stone wall, and,
127 square feet brick wall built.
40,000 feet of carriage timber taken down and repiled.
50,000 feet of carriage timber taken down, cut to proper lengths, and repiled.
40,000 feet of carriage timber hauled from the upper park shed to the lumber shed, and repiled in it.
47,000 feet of carriage timber inspected, hauled, and piled in shed; the centre heart bored out of the large pieces of carriage timber which had been received with it in.

A board fence, 579 feet long and 9 feet high, and a shed 40 feet long and six feet wide, erected.

The old lime-house and 75 feet of protection wall removed.

430 lineal feet of wooden gutters, covered with copper, made, and put on the brick warehouse.

A coal-house and privy, 29 feet long, 12 feet wide, and 10 feet high, built and covered with zinc.

A roof, 165 by 30 feet, covered with zinc.

4 heavy wooden gates, made and hung.

2 hammered stone wing walls, 17 feet long and 9½ feet high, and 4 cut stone piers built.

282 lineal feet of cut stone coping dressed and laid.

5 feet of each of 23 chimneys, 10 feet of each of 5 chimneys, and 16 feet of one chimney, taken down, re-built and painted.

322 square feet of lath and plaster partition put up.

The old case-hardening furnace taken down, and a new one built in another place.

2 large bins, for forage, put up.

The interior arrangement of 19 ammunition chests altered.

1,566 loads of gravel, sand, &c,, hauled and spread on the public walks, roads, &c.

1,900 pounds of lead, hauled to Pittsburg, rolled, and brought back.

22 10-inch columbiads, inspected, proved, and hauled from the proving ground to the arsenal.

94 barbette carriages taken down, their axles, &c., oiled, and then placed on blocks to preserve them from damp.

A room 19 feet by 20 feet, partitioned off in the new machine shop engine-house, and fitted up for drying accoutrements, &c.

The quarters, barracks, shops, magazines, laboratories, stables, pro tection walls, walks, roads, machinery, tools, harness, gas and water works, &c., kept in good order.

Work done in the new machine shop and its engine-house:

16,600 feet of oak flooring laid.

16,600 feet of pine ceiling put up and painted.

2 flights of stairs, each 25 by 4¼ feet steps; and 1 flight of stairs 23 by 3 feet steps; and 126 lineal feet of balusters and hand-rails made and put up.

13 doors, 75 windows, 23 girders, and 2 hatches, cased.

An opening over the new engine cased and railed.

1,800 square feet of brick flooring laid.

2,175 square yards of plastering put up.

75 windows painted.

WASHINGTON ARSENAL, COMMANDED BY BREVET MAJOR A. MORDECAI.

The operations at this arsenal during the last year have been conducted on the same limited scale as for several previous years, and offer no results worthy of special notice.

The following list shows the principal articles fabricated at the arsenal during the year:

52 24-pounder barbette gun carriages.

60 24-pounder barbette gun chassis.

8 portable forges,
8 sets carriage-maker's tools, } for mountain service.

10 sets of iron work for caissons.

6 hand sling carts.
27 pendulum hausses for field guns.
3,751 rounds of fixed ammunition for field service
114,000 Maynard's primers for small arms.
62 pole straps and pads for field carriages.
Parts of 100 sets of artillery harness.
Various tools and stores for the service of field batteries.

Permanent improvements.

For the reasons stated in several of my last annual reports, no estimate was presented last year for making permanent improvements, and none is now offered except for the necessary repairs and preservation of the buildings and stores. The condition of the principal workshops, as described in my reports and in those of the inspector of arsenals, continues to become worse every day, and yet it is not advisable to take any steps towards rebuilding them on their present sites, or extensively repairing them, on account of the insecure foundation on which they rest. On this subject I can only repeat the suggestions so often made heretofore, as to the necessity of procuring a retrocession of the grounds which were taken from the arsenal to accommodate the penitentiary buildings. It is only in this way that a proper site can be obtained for building new workshops in a style creditable to the Ordnance Department, and suitable for an establishment at the seat of government.

FORT MONROE ARSENAL, COMMANDED BY BVT. MAJOR G. D RAMSAY.

Since the last annual report the marsh adjoining the ordnance stables has been filled in, so far as the injunction of the courts of Virginia in the case of French *vs.* United States would admit of.

No other permanent improvement has been carried on.

Work done.

The following summary exhibits the principal ordnance stores which have been fabricated during the year, viz:

16 32-pounder casemate gun-carriages.
15 24-pounder howitzer casemate gun-carriages, complete.
6 32-pounder barbette carriages, with chassis.
10 sets iron work, complete, for 24-pounder barbette carriages.
54 casemate gun-carriages, supplied with elevating screws and eccentric rollers.
8 budge barrels.
60 manœuvring handspikes.
50 pass-boxes.
41 24-pounder rammers and staves.
41 24-pounder sponges and staves.
182 tube pouches and a quantity of artillery implements.
114 rounds of ammunition for cannon.

50 stands of 24-pounder grape shot.
851 cartridge bags for cannon.
1,500 portfires and 100 signal rockets.
3,400 paper fuses for field ammunition.
1 casemate gun, 6 lifting jacks.
1,070 pounds brass castings, for parts of gun carriages.
54 packing boxes.

Average force employed at the arsenal: 28 mechanics and laborers, and 12 enlisted mechanics and laborers.

The amount of disbursements at this arsenal during the year was $19,150 11.

Experiments.

Experiments were made to test the adaptation of an elevating screw to the 10-inch seacoast mortar; also to test the 10-inch columbiad gun carriage. Reports in full, with accompanying drawings, were transmitted to the ordnance office. In addition to these, there were experimental firing of a rifled cannon, with flanged shells, in April, June, and July, the results of which are reported in detail.

ST. LOUIS ARSENAL, COMMANDED BY CAPTAIN R. H. K. WHITELEY.

The operations at this arsenal during the year embraced the following:

1. *Carpenter's shop.*—This building, 42 feet by 70, and 2½ stories high, which was reported last year in progress of construction, has been completed, painted, and occupied.

2. *Timber shed.*—30 feet by 192½, 1 story high, brick end walls, brick piers, and spaces between the piers filled with slats, so as to admit a free circulation of air, has been finished and filled with lumber and siege carriages. This building was reported nearly completed June 30, 1853.

3. 203½ feet heavy coping, (cut stone,) laid on walls of bastard range work between officers' quarters and principal storehouse, and 203½ feet of iron musket railing, made and set up, complete, on coping.

4. The roofs and windows of nearly all the buildings at this arsenal and on the magazine lot, northern end of Jefferson Barracks Reserve, were damaged by a tornado, April 26, 1854. The repair of all, with one exception, has been completed, and 1,079 lights of glass replaced.

5. Pond between coal-house and western wall filled up; 1,600 loads of sand carted from the river bank for this purpose.

Fabricated.

12 sponge and 21 tar buckets, iron.
100 cannon lock cords.
40 cannon spikes.
31 fuse plug reamers.
22 linstocks.
14 pendulum hausses, seats, and muzzle sights.

25 prolonges.
54 6-pounder sponges and rammers.
1 4-pounder sponge and rammer.
27 tangent scales.
127 thumb-stalls and 42 vent punches.
2,688 rounds of ammunition for field artillery.
2,720 cartridge bags.
170,790 cartridges for small arms.
7,050 paper fuses.
500 signal rockets.
55 staves for sponges and rammers.
230 rammers and sponge heads.
185 fellies and 200 spokes for field carriages.
32 cannon lock pins and screws.
11 cap square chains.
434 cold shut S links.
10 hounds for field carriages.
30 keys for ammunition chests.
20 key chains and rings.
15 linch-pins.
20 stay-pins.
14 pounds nails, Nos. 1 and 2.
28 nave bands, developed.
22 nuts, assorted.
47 spare poles and straps.
38 pole and pad rings, keys and chains.
4 splinter bars.
6 stocks, caisson and battery wagon, not ironed.
600 leather straps for ammunition chests.
36 trays straps for ammunition chests.
54 double eyes for artillery.
1,338 chains for leather traces.
1,338 loops and 4,014 rivets for leather traces.
4,162 sabots for field ammunition.
5,340 fuse plugs and 92 tin cans.
1,328 arm-chests and packing boxes.
55 battery wagons and fuse boxes.
5 sets of irons and brass boxes for grindstones.

Repaired.

1,093 small-arms.
188 artillery harness.
45 pack-saddles and harness.
4 carriages, 4 caissons, 1 travelling forge, and 1 battery wagon, received from light company E, 3d artillery, and returned.

Altered.

2,401 small-arms from flint-lock to percussion.
2,861 pistols do. do. do.

315,997 cartridges for small-arms from flint lock to percussion.
29,615 small-arms cleaned and oiled.
Parts of muskets and carbines finished.

Received from foundry and inspected.

135 24-pounder shells and spherical case shot.
1,505 12-pounder do. do. do.
466 6-pounder do. do. do.
5,154½ pounds 6-pounder canister shot.
5,012½ pounds 12-pounder howitzer shot.

WATERTOWN ARSENAL, COMMANDED BY MAJOR E. HARDING.

STATEMENT OF THE PRINCIPAL OPERATIONS AT THE WATERTOWN ARSENAL, DURING THE YEAR ENDING JUNE 30, 1854.

Articles fabricated.

21 8-inch columbiad gun-carriages, new pattern.
24 8-inch columbiad chassis, new pattern.
28 8-inch columbiad platforms, new pattern.
1 8-inch columbiad carriage-model, quarter size.
1 platform for 10-inch siege and garrison mortars.
16 8-inch elevating jacks.
30 chocks for columbiad carriages.
21 elevating bars for columbiad carriages, (iron.)
84 handspikes, truck, (iron.)
499 handspikes, manœuvring, for garrison carriages.
64 lanyards for cannon locks and primers.
30 priming-wires for siege and garrison carriages.
2 rammers and staves for 8-inch columbiad.
16 tompions for do.
6 vent punches.
24 wrenches for columbiad carriages.
197 wads, junk and hay.
35 8 and 10-inch cartridge-bags.
1,820 do. sabots.
391 do. cartridge-blocks.
2 lifting-jacks.
100 pounds of horse-shoes.
365 feet of iron pipe.
749 pounds mixed paint.
4 screw-wrenches.
1 covered wagon.
86 packing-boxes.
1,532 feet brick sewer.

Other work.

50 barrels cannon powder proved.

240 cannon—various calibres—cleaned, oiled, and lackered.
10,704 24-pounder shot cleaned, oiled, and lackered.
340 feet of iron skidding cleaned, oiled, and lackered.
4,680 muskets cleaned and oiled.
10,715 yards of painting put on public buildings.
2,541 handspikes painted.
24 ammunition-chests painted.
68 8-inch rammers, sponges, worms, and staves painted.
60 budge-barrels, linstocks, pass-boxes, and shell-hooks painted.
25 24-pounder barbette carriages oiled.
21 8-inch carriages complete, painted.
3,140 lights of sash, drawn.
40 ceilings of public buildings cleaned and whitened.
10,850 yards of fence whitewashed.
6,825 feet road way excavated and filled in with stone.
6,129 feet trench, for water-pipe, excavated and refilled.
312 feet coping of public buildings repaired.
55,441 feet oak timber piled.
45,178 feet chesnut timber piled.
41,096 feet pine timber piled.
7,749 feet walnut timber piled.
2,859 feet poplar timber piled.
1,728 feet hickory timber piled.
45,537 pieces for stockrail carriages, piled.
432 naves turned and painted.
989 loads of topsoil, stone, and gravel, hauled for grading and improving public grounds.

Officers' quarters, barracks, shops, and stores, repaired and kept in order as the service required; a night watch was kept up throughout the year for the protection of public grounds, buildings, and other property. Much other labor was performed of a public nature, which, if detailed, would unnecessarily swell the length of this report.

NORTH CAROLINA ARSENAL, COMMANDED BY CAPT. J. A. J. BRADFORD.

STATEMENT OF THE CHIEF OPERATIONS AT THIS ARSENAL, DURING THE YEAR ENDING JUNE 30, 1854.

Under the appropriation for arsenals.—Work done on quarters No. 2, unfinished.—One hundred and ninety-six superficial yards plaster and 140 lineal feet of plaster cornice done in interior; foundations of front portico excavated and 65 cubic feet stone and 167 feet brick masonry laid therein; columns, entablature, and floor of rear piazza placed and painted; south piazza finished and painted; ridge-lead of roofs painted; doors finished and framed; all the window-sash finished, glazed, and fitted in place; stone quarried and cut for plat and coping of portico; cover prepared for attached cistern; building temporarily closed to protect its interior from the action of the weather, &c.

On repairs of quarters, No. 1.—Old blinds of rear piazza windows removed; new frames substituted for old; new blinds substituted for old; 128 lights sash made, glazed, and fitted; doors made for north

and south entrances of piazza; all this wood-work and some old wood-work painted; all the exterior stone-work weather proof painted, and brick-work yellow washed, &c.

On magazine for powder in bulk.—Plat stone of entrance, steps cut, &c.

On connecting walls, &c.—One hundred and two superficial feet stone coping cut; picket fence erected and two gates fitted in the same.

Cistern constructed; portions of *terre-plein* of square graded; brick removed from kilns and stacked; portions of connecting walls yellow washed; quarry operations begun and 200 cubic feet of stone quarried; roadways within and exterior to square repaired of frequent damage by rain wash; upwards of 2,000 trees in rear grounds trimmed and undergrowth, rubbish, &c., removed. Same in square, but of less extent; old fence removed, and 83 lineal feet of division fence erected on south side of square; old clay-mill shed removed from former brick yard; old refuse lumber lying near it collected and piled; drain opened to relieve square of interior wash; 21,287 superficial feet lumber received, measured, and stacked for drying; plats of square planted in grass-seed, &c.; boundary fence inspected, and repaired from time to time.

Ordnance service.

Eight thousand and six muskets, inspected, cleaned, oiled, &c.; bronze battery, carriages, &c., repeatedly cleaned, dusted, aired, &c.; battery harness, oiled; quarry tools, implements, &c., made, repaired, &c., from time to time; 150 bushels, smiths' coal hauled from river to post; police, ventilation, &c., of public stores, magazines, and general police of post, and care, and preservation of grounds, &c.

FRANKFORT ARSENAL, COMMANDED BY BREVET MAJOR, P. V. HAGNER.

PRINCIPAL OPERATIONS AT FRANKFORT ARSENAL, DURING THE YEAR ENDING JUNE 30, 1854.

Buildings.

A two-story brick dwelling for master armorer has been erected near the shops—main building 28 by 28 feet, with one-story back building 21 by 15 feet, with cellar under main building. A frame shed at the matron's quarters, a shed to the stable, and a portico to the commanding officer's quarters, have likewise been completed. Lightning rods have been attached to all the buildings not previously provided with them. All necessary repairs and such improvements as were authorized, have been made to the various buildings. Much of this work has been done by the labor of the enlisted men.

Roads and grounds.

Eight hundred running feet, sixteen feet wide, of the road-way in front of the arsenal, have been macadamized, and work done in filling up and grading the low grounds, and improving the roads within the

enclosure, with manifest advantage to the general health of the residents, and to the appearance of the arsenal.

The plan adopted for cultivating the grounds continues to work well. A large and increasing proportion of the forage required is obtained from the public grounds at a cost much below the present market rates.

Machinery and shop-work.

The chief work assigned to this arsenal has been the manufacture of percussion caps, friction tubes for cannon, and primers for small arms, altered according to Maynard's plan. No change has been found requisite in the machinery for making caps; during the year 400,000 have been made, and the machine will be worked from time to time in order to keep the requisite supply on hand.

As all the trials of the friction tubes yet made have resulted satisfactorily, and the tube has been approved by the Ordnance Board, the arrangements for the manufacture of them have been extended so as to facilitate and economise their fabrication. A new machine for drawing the tubes is nearly finished, and a very neat machine for cutting, milling, and drilling the tubes at one handling, is in successful operation; 58,000 have been made during the year.

After many experiments with a view to the improvement of Maynard's primers, as required by orders dated July 30, 1853, and April 8, 1854, it was found that a string of primers could be made of paper sufficiently water-proof for the usual requirements of service, superior in this respect to those previously made, and nearly equal to percussion caps. To facilitate the manufacture, a machine was constructed for charging and pressing the sheets of primers, and also a machine for slitting the sheets into strips; both of these work effectually and economically; 240,000 have been made of paper, and experiments are now in progress with a view to use sheet copper for the purpose, so that the primers will be a string of caps exactly like the present cap, and consequently equally water-proof. A strip of this kind, made at Watervliet, under Major Laidley's directions, gave very satisfactory results before the Ordnance Board, and it seems probable that all objections to the use of copper for the strips can be overcome.

During the year, 2,020 muskets have been altered to percussion, and a large number of musketoons, pistols, and sabres, have been thoroughly repaired.

A saddler has been employed very advantageously in repairing and refitting leather accoutrements, &c., partly worn, a large quantity of which has been collected during many years. The belts have been blackened, and cartridge boxes and cap pouches reformed and repaired.

NEW YORK ARSENAL, COMMANDED BY BVT. MAJOR W. A. THORNTON.

REPORT OF OPERATIONS AT THIS ARSENAL DURING THE YEAR.

Constructed two cisterns for supplying water to store-houses and

barn, each cistern 12 by 12 feet; also 329 feet of 12-inch sewer to remove surplus water from cisterns, through privies.

Barracks and quarters have been enlarged by extending the walls of out building up one story, to obtain additional dwelling apartments.

Fabricated.

23 platforms for siege carriages, complete.
500 6-pounder flannel cartridge-bags.
49 arm-chests, with hinges, clasps, and corner irons.
88 lanyards for cannon locks.
35 cone picks.
2 muzzle sights for 6-pounder guns.
1 drill stock iron.
1 crank and frame for grindstone, for issue.
1 tinner's furnace and soldering irons.
4 shoulder washers for field carriages.
4 swedges, smith's.
1 screw driver and 7 spring bolts, large size.
745 pounds paint, for issue and use.
12 pounds spikes and rivets.
400 bolts, nuts, and washers, for barbette carriages.
16 doors and gates.
180 feet copper gutter and pipe.
40 windows and sky-lights.
158 packing boxes.

Repaired.

15 muskets, by stocking and many new parts, for troops.
10 swords, by new scabbards, handles, and cleaning.
3 6-pounder carriages, by many new parts and painting.
2 6-pounder caissons, by many new parts and painting.
9 ammunition chests, new lined and painted.
1 garrison-gin, by new pry-pole and painted.
61 garrison buckets, new bottoms and painted.
28 sponges, adapted to 24 and 32-pounder heads, &c.
1 budge-barrel, new leather top and painted.
3 dark lanterns, new horned lights and painted.

Other work done.

65 parts of carriages dressed out, assembled and prime painted.
15,041 muskets, pistols, rifles, and carbines, cleaned, oiled and reboxed.
6,476 swords and sabres cleaned, oiled, and reboxed.
5,128 cannon locks cleaned, oiled, and reboxed.
8,500 cartridge boxes and pouches cleaned and reboxed.
24 cannon locks adjusted to guns.
600 square feet of temporary shot-bed put down.
15,879 balls and shells re-examined by gauging.
87,810 balls and shells cleaned, lackered, and piled.

351 guns, howitzers, and columbiads reskidded.
501 guns, howitzers, columbiads, and mortars cleaned and lackered.
49 iron-top carriages and mortar-beds cleaned and lackered.
5,500 6-pounder balls and case shot boxed for shipment.
1,575 boxes of stores, strapped with hoops, for shipment.
209 barrels powder recoopered by setting 200 new hoops.
64 packing boxes repaired.
50 casks of cement recoopered and lined for shipment.
2,056 cubic yards filling and excavation.

Cisterns made, buildings repaired and painted, and large quantities of supplies received and issued.

Inspection at contract establishments.

50 carbines, Sharp's patent.
10 rifles, Porter's patent.
3,900 rifles, percussion, steel barrels.
4,000 pistols, percussion, steel barrels.
1,000 pistols, Colt's patent.
8,045 infantry cartridge boxes.
4,728 infantry cartridge box plates.
7,800 cartridge box belts.
4,174 cartridge box belt plates.
10,410 waist belts, 1½ inches wide, (privates.)
6,600 waist belt plates.
7,310 bayonet scabbards.
188 bayonet scabbard belts.
800 bayonet scabbard belt plates.
9,288 gun slings.
705 rifle pouches.
1,734 rifle pouch and flask belts.
3,075 rifle cartridge boxes.
3,128 rifle cartridge box plates.
1,110 rifle waist belts, 1.9 inches wide.
725 rifle waist belt plates.
800 carbine cartridge box plates.
746 cavalry sabre belts.
905 artillery sword belts and plates.
590 cavalry sabre belt plates.
227 non-commissioned officers' shoulder belts.
448 non-commissioned officers' shoulder belt plates.

BENICIA ARSENAL, COMMANDED BY BREVET CAPTAIN C. P. STONE.

REPORT OF THE PRINCIPAL OPERATIONS AT THIS ARSENAL DURING THE YEAR ENDING JUNE 30, 1854.

Buildings erected.

A substantial storehouse, 100 feet long by 40 feet wide, two stories high, has been completed.

Another storehouse, of the same dimensions, was commenced during the month of March, 1854, by order of Brevet Major General Wool, commanding the department of the Pacific, but was not completed for want of funds. This storehouse, as well as a magazine and quarters for officers and men, are much needed at this post, as the men are quartered in the shops. The officers have to provide for themselves; and the powder and ammunition are stored in a wooden building, and necessarily in the same room with other stores, while much valuable property remains without store-room.

A quarry of excellent stone has been opened on the arsenal grounds, and substantial buildings can now be erected here with little more expense than in the Atlantic States.

Fabricated during the year.

37,950 cartridges for small arms.
15 large tarpaulins.
33 arm chests.
54 ammunition packing boxes.
48 rounds mountain howitzer ammunition.
662 6-pounder cartridges.
6 trail handspikes.
2 grates for heating 32-pounder shot.
1 4-wheeled truck for hauling stone.
200 fuses (paper cases) for columbiad shells.
20 priming-wires, and a large quantity of tools, tables, benches, &c., for fitting up the laboratory and shops, and for quarrying stone.

Repaired.

999 percussion muskets made serviceable.
413 bayonets, 2 cavalry musketoons, 1 cavalry pistol, 22 musicians' swords, 16 non-commissioned officers' swords, 1 12-pounder field howitzer carriage, 1 12-pounder caisson, 2 6-pounder field carriages, 2 8-inch barbette carriages, and 15 pintle crosses, all made serviceable.
1 sling cart, 1 wagon, 1 stone truck, and 5 arm chests, repaired.

Other work done.

Shot bed, 100 feet long, 9 feet wide, of stone and cement, made.
26,458 shot and shells, scraped, lackered, and piled.
20 barbette chassis and carriages scraped and painted.
9 32-pounder guns, 5 8-inch navy guns, and 10 24-pounder guns, mounted and placed in batteries for the defence of San Francisco harbor.
Supplies of ammunition furnished.
595 infantry cartridge box belts, and 101 cavalry sabre belts, white, changed to black.
The ordnance and ordnance stores required for the troops in the de-

partment of the Pacific, have been, with few exceptions, packed and sent from this arsenal.

MOUNT VERNON ARSENAL, COMMANDED BY LIEUT. J. GORGAS.

Report of the principal operations at the post, for the year ending June 30, 1854.

Quarters No. 1 have been repaired according to the estimate; the piazza on the west side is enclosed, and the frame wing addition has been replaced by a brick one two stories high, and 17 feet square. These quarters are now in good order.

The painting and repairs of the arsenal have been completed, and that of the barracks, with the exception of the wooden cornice of the piazza of second story, and the brick pavement of first story.

The old office has been taken down, except such parts of the wall as were sound, and rebuilt with a pitch of 13½ feet. A piazza has been added to the south side. This is completed throughout.

All the buildings, except quarters, and nearly all the bricks walls, have been cement-washed.

The alteration of flint to percussion muskets was begun in June, and 400 completed.

A force of carpenters and laborers has been kept at work in the repair of the armaments of Forts Pickens and McRee, since the first of May. The barbette guns, hitherto so much exposed, have been stowed away in casemates, secured from the weather, and will not again need repairs for many years. Both these forts will be in good order, as to their armament, by the middle or close of October. The repairs of the carriages (except axle bodies) have been made with the heart pine (light wood) of the country.

Eight pent-houses have been made at this post and forwarded to Pensacola harbor, for the guns there kept mounted in barbette.

VANCOUVER DEPOT, WASHINGTON TERRITORY, IN CHARGE OF MILITARY STOREKEEPER T. J. ECKERSON.

In accordance with article 149 of the Ordnance Regulations, the following is reported as the principal operations at this post during the year ending June 30, 1854:

A temporary magazine of wood, 15 by 30 feet, has been built to answer the purpose of storing ammunition and powder, until permanent buildings are erected.

The expedition conducted by Brevet Captain G. B. McClellan, corps of engineers, as well as that under Lieutenant R. Saxton, 4th artillery, both connected with the Northern Pacific railroad survey, were supplied with arms, &c., from this depot. Arms and ammunition were also furnished, on the requisition of the governor of Oregon, for the sup-

pression of Indian difficulties in the Rogue river valley in that Territory.

77 boxes of stores received and issued.
24 sets harness cleaned and oiled.
Small arms in store oiled and repacked.
Stores removed from old to new magazine.
5 field carriages,
6 caissons,
1 battery wagon, and
2 traveling forges,
} painted.

A. K. CRAIG, *Colonel of Ordnance.*

ORDNANCE OFFICE,
Washington, October 24, 1854.